INDUSTRIAL MEDICINE AND SURGERY

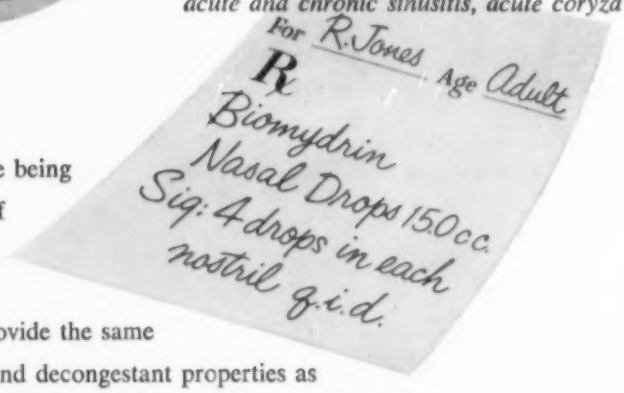
Volume 23 JULY 1954 Number 7

NEW!

BIOMYDRIN® Nasal DROPS

Companion product to
BIOMYDRIN NASAL **SPRAY**

In infectious and allergic rhinitis, acute and chronic sinusitis, acute coryza



Biomydrin Nasal Drops are being introduced at the request of physicians who prefer drops for nasal therapy. Biomydrin Nasal Drops provide the same bactericidal, anti-allergic, and decongestant properties as Biomydrin Nasal Spray. Biomydrin Nasal Drops also make it more convenient to apply Biomydrin by tampon or wick.

Dosage: Adults, 4 to 5 drops in each nostril 4 or 5 times a day. Infants and children, 1 to 3 drops in each nostril 3 times a day. Supply: ½ ounce bottle with dropper.

NEPERA CHEMICAL CO., INC.
Pharmaceutical Manufacturers • Yonkers 2, N. Y.

4 out of 5 former fatties...

gain it right back!

the *Am Plus*® **post-diet plan**

for the 80%
who fail to sustain
weight loss
*after the diet**

*Aaron, H.: *Weight Control*, Consumer Reports 17:100 (Feb.) 1962.

Just one AM PLUS capsule daily, taken when hunger becomes excessive: before the day's "big" meal, before a club lunch or dinner, at snack time. The patient decides when.

A unique combination of dextro-amphetamine plus the original formula of 19 important vitamins and minerals, AM PLUS rehabilitates post-dieting habits while it augments nutritional intake.

536 Lake Shore Drive, Chicago 11, Illinois

8 good reasons for using 'POLYSPORIN'®

POLYMYXIN B—BACITRACIN OINTMENT

1. ANTI-GRAM-NEGATIVE AND ANTI-GRAM-POSITIVE

Combines the bactericidal activity of 'Aerosporin'® Sulfate Polymyxin B Sulfate against gram-negative bacilli with that of bacitracin against gram-positive organisms.[1,2] Their effects are completely additive.[3]

2. ANTI-PSEUDOMONAS

'Aerosporin' is the most effective therapeutic agent known against *Pseudomonas* (*pyocyaneus*).[6] *Pseudomonas* organisms commonly gain access to skin and lesions from the air and occasionally from instruments, dressings and drug solutions.[7]

3. MINIMAL SENSITIZATION

'Aerosporin' and bacitracin have low indices of allergenicity; an important advantage over penicillin, streptomycin, and sulfonamides.[5,6]

4. NO DAMAGE TO TISSUES

In concentrations used locally the antibiotics do not damage tissue or blood cells—compare this with the effects of chemical antiseptics.[6,7,8]

5. NEGLIGIBLE ABSORPTION

Systemic absorption of 'Aerosporin' or bacitracin from intact skin, mucous membranes, or lesions of either is practically nil.[6,8]

6. RAPID DRUG RELEASE FROM BASE

Non-aqueous base readily gives up the antibiotics to skin and tissue fluids. Absence of water from the base insures stability of the antibiotics.[4]

7. SPARING GENERAL ANTIBIOTIC SENSITIZATION

Use of rarely-sensitizing 'Aerosporin' and bacitracin for local lesions avoids possible sensitization to penicillin, streptomycin, or the broad-spectrum antibiotics, thus leaving the patient responsive to them in case of serious systemic infection.

8. PROPHYLACTIC VALUE

To protect burns, skin grafts, and other lesions from contamination by practically all bacterial pathogens, particularly *Pseudomonas*. Prevention of infection probably shortens healing time and reduces incidence of fever and inflammation.[7]

'POLYSPORIN'® Polymyxin B – Bacitracin Ointment

Available in ½ oz. and 1 oz. tubes and ⅛ oz. ophthalmic tubes

REFERENCES

1. Frank, P. F., Wilcox, C., and Finland, M.: In Vitro Sensitivity of Coliform Bacilli to Seven Antibiotics, J. Lab. & Clin. Med. *35:* 188 and 205, 1950.

2. Johnson, B. A., Anker, H., and Meleney, F. L.: A New Antibiotic Produced by a Member of the B. subtilis Group, Science *102:* 376, 1945.

3. Jawetz, E., and Marshall, M. S.: The Role of the Laboratory in Antibiotic Therapy, J. Pediat. *37*:545, 1950.

4. Wrong, N. M., et al.: The Treatment of Pyogenic Skin Infections with Bacitracin Ointment, Canad. M. A. J. *64:* 395, 1951.

5. Finnerty, E. F., Jr.: Bacitracin in Dermatology, New England J. Med. *245:* 14, 1951.

6. Jawetz, E.: Infections with Pseudomonas aeruginosa Treated with Polymyxin B, Arch. Int. Med. *89:* 90, 1952.

7. Jackson, D. M., Lowbury, E. J. L., and Topley, E.: Pseudopyocyanea in Burns, Lancet *261:* 137, 1951.

8. Meleney, V. L., and Johnson, B. A.: Bacitracin Therapy, J. A. M. A. *133:* 675, 1947.

Burroughs Wellcome & Co. (U. S. A.) Inc.

Tuckahoe 7, New York

INDUSTRIAL MEDICINE AND SURGERY

The Journal of Medicine in Industry

This Journal is dedicated to the advancement of sound industrial medicine, including the surgery of industrial trauma. To that end its varying contents will embrace scientific papers, reports, digests, news items and official statements, together with editorial comment. The editorial policy is to avoid undue censorship. Some contributions ably prepared will be published although contravening the personal opinions of the editors. Care will be exercised in checking the accuracy of known facts, as printed, but in all other respects statements and opinions are those of the author and may not be shared by the editors. On any article, the editors reserve the right to comment favorably or otherwise, in the current or any subsequent issue. On this basis, contributions are invited. The opinions expressed in any contributions, including the editorials of this Journal, do not necessarily reflect the attitude or opinions of any associated organization.

Volume 23 JULY, 1954 *Number 7*

CONTENTS

BERYLLIUM EXTRACTION, REDUCTION, AND ALLOY FABRICATION—AN ENGINEERING STUDY COVERING TEN YEARS' EXPERIENCE ... Joseph Shilen, M.D., Fred B. Koppenhaver, John G. Cleland, Lewin R. Lutz, and Virginia M. Vought 291

RESPONSIBILITY OF THE PROFESSIONS IN THE HEALTH EDUCATION OF THE EMPLOYEE:

VIEWPOINT OF THE INDUSTRIAL HYGIENIST ... Clyde M. Berry, Ph.D. 300

VIEWPOINT OF THE INDUSTRIAL PSYCHOLOGIST ... W. A. Eggert, Ph.D. 303

THE ACCIDENT PARADE ... K. T. Johnstone, M.D. 307

THE PREVENTION OF GAS GANGRENE AND TETANUS ... Oscar P. Hampton, Jr., M.D. 309

THE CARDIAC CAN WORK ... S. Charles Franco, M.D. 315

INDUSTRIAL MEDICINE—AND DISASTER:

ATOMIC BOMB PREPAREDNESS ... A. F. Lecklider, M.D. 325

THE GENERAL MOTORS DISASTER AT LIVONIA ... Gordon A. Eadie, M.D. 327

THE WACO TORNADO ... H. Jaworski, M.D. 329

SYMPOSIUM ON INSTRUMENTATION FOR INDUSTRIAL HYGIENE ... 326

INDUSTRIAL MEDICAL ASSOCIATION: PRESIDENT'S PAGE ... Robert C. Page, M.D. 328

GUIDING PRINCIPLES OF OCCUPATIONAL MEDICINE ... 329

LETTERS ... Louis J. Berg, M.D.; W. A. Hamor; J. G. Downing, M.D. 330

BOOKS ... 331

INDUSTRIAL MEDICINE'S HALL OF FAME—DR. LUIGI CAROZZI ... Robert T. Legge, M.D. 332

EDITORIAL:

Prelude to Silicosis ... 333

Associations: Officers and Directors ... 4, 6, 8, 10

Personal News ... 6, 8, 10, 12

News, Comment, Opinion ... 27

[Advertisers' Index ... 36]

INDUSTRIAL MEDICINE AND SURGERY, The Journal of Medicine in Industry (with which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery"): Entered as second class mail matter August 28, 1941, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879. Reentered, October 3, 1949. Additional entry at Sheboygan, Wisconsin. Published on the fifth of each month by INDUSTRIAL MEDICINE PUBLISHING COMPANY, Chicago. STEPHEN G. HALOS, President and Advertising Manager; STEPHEN F. HALOS, Vice-President and Assistant Advertising Manager; A. D. CLOUD, Publisher; CAREY P. MCCORD, M.D., Editor; DORIS FLOURNOY, Editorial Assistant; HAROLD A. HOOPER, Treasurer. Member, Audit Bureau of Circulations. PUBLICATION, EDITORIAL and EXECUTIVE OFFICES, 605 North Michigan Avenue, Chicago 11, Illinois. Subscription $6.00 per year in the United States; $8.00 (U.S. Currency) per year in Canada; $12.00 (U.S. Currency) per year in other countries. Single copies 75 cents. Title Registered in United States Patent Office. Rd. Canada, 1942. Copyright, 1954, by Industrial Medicine Publishing Company, Chicago. CHANGE OF ADDRESS: FOUR weeks' notice required; changes cannot be made without old address as well as new; please furnish zone number for new address if city requires it.

INDUSTRIAL AND RAILWAY MEDICAL AND SURGICAL ASSOCIATIONS

INDUSTRIAL MEDICINE AND SURGERY

is the official publication of these organizations but is independently owned and published

INDUSTRIAL MEDICAL ASSOCIATION

OFFICERS

President:
ROBERT COLLIER PAGE, M.D.,
Standard Oil Company (N.J.),
30 Rockefeller Plaza,
New York 20, New York.

President-Elect:
KIEFFER DAVIS, M.D.,
Phillips Petroleum Company,
Bartlesville, Oklahoma.

First Vice-President:
E. S. JONES, M.D.,
418 Calumet Building,
Hammond, Indiana.

Second Vice-President
JEROME W. SHILLING, M.D.,
Pacific Telephone & Telegraph Co.,
740 S. Olive Street,
Los Angeles 14, California.

Secretary:
H. GLENN GARDINER, M.D.,
Inland Steel Company,
East Chicago, Indiana.

Treasurer and Managing Director:
EDWARD C. HOLMBLAD, M.D.,
28 East Jackson Boulevard,
Chicago 4, Illinois.

DIRECTORS
1953-55

EDWIN DEJONGH, M.D.,
Detroit Diesel Engine Division,
General Motors Corporation,
Detroit, Michigan.

JOHN E. KIRKPATRICK, M.D.,
516 Sutter Street,
San Francisco 2, California.

H. W. LAWRENCE, M.D.,
Procter and Gamble Company,
Cincinnati 17, Ohio.

JOHN L. NORRIS, M.D.,
Kodak Park Works, Eastman Kodak Company, Rochester, New York.

CHARLES F. SHOOK, M.D.,
Owens-Illinois Glass Company,
Toledo 1, Ohio.

R. LOMAX WELLS, M.D.,
Chesapeake & Potomac Telephone Co.,
Washington 5, D.C.

1954-56

LEONARD S. ARLING, M.D.,
Northwest Industrial Clinic,
3101 University Ave., S.E.,
Minneapolis 14, Minnesota.

PAUL J. BAMBERGER, M.D.,
Bethlehem Steel Company,
Bethlehem, Pennsylvania.

ROBERT E. ECKARDT, M.D.,
Esso Laboratories,
Standard Oil Development Co.,
P. O. Box 51,
Linden, New Jersey.

D. JOHN LAUER, M.D.,
Jones and Laughlin Steel Corp.,
401 Liberty Ave., Gateway Center,
Pittsburgh 30, Pennsylvania.

E. P. LUONGO, M.D.,
General Petroleum Corporation,
612 South Flower Street,
Los Angeles 54, California.

EDWARD J. SCHOWALTER, M.D.,
Western Electric Company,
Hawthorne Station,
Chicago 23, Illinois.

BOARD OF EXAMINERS FOR FELLOWSHIP

MCIVER WOODY, M.D., 1952-55.
ADOLPH, G. KAMMER, M.D., 1953-56.
MELVIN N. NEWQUIST, M.D., 1954-57.

DISTRICTS AND COUNSELORS

District

1 JAMES I. ROBERTS, M.D.
Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island.

2 S. CHARLES FRANCO, M.D.
Metropolitan New York and Northern New Jersey.

3 JOHN L. NORRIS, M.D.
Niagara Frontier District.

4 GLENN S. EVERTS, M.D.
Eastern Pennsylvania, Southern New Jersey, Delaware.

5 WALTER E. FLEISCHER, M.D.
Maryland, Virginia, District of Columbia.

6 EDWARD M. GUNN, M.D.
North Carolina, South Carolina.

7 ALLEN M. COLLINSWORTH, M.D.
Florida, Georgia.

8 JOSEPH T. NOE, M.D.
Western Pennsylvania, West Virginia.

9 REX H. WILSON, M.D.
Eastern Ohio.

10 H. W. LAWRENCE, M.D.
Western Ohio.

11 PAUL J. OCHSNER, M.D.
Michigan.

12 JULIAN E. WILLIAMS, M.D.
Tennessee.

13 GRADIE R. ROWNTREE, M.D.
Kentucky.

14 HARRY V. SIMS, M.D.
Alabama, Mississippi, Louisiana.

15 EMMETT B. LAMB, M.D.
Illinois, Indiana.

16 DANIEL E. DORCHESTER, M.D.
Wisconsin and Upper Michigan Peninsula.

17 LEONARD S. ARLING, M.D.
Minnesota, North Dakota, Iowa, South Dakota.

18 R. EMMET KELLY, M.D.
Missouri, Kansas, Nebraska.

19 TOM HALL MITCHELL, M.D.
Arkansas, Oklahoma.

20 GEORGE V. LAUNEY, M.D.
Northern Texas.

21 CARL U. DERNEHL, M.D.
Southern Texas.

22 RONALD P. RAWLINSON, M.D.
Montana, Idaho.

23 NATHANIEL A. THOMPSON, M.D.
Wyoming, Colorado, Utah, Nevada.

24 LEWIS M. OVERTON, M.D.
Arizona, New Mexico.

25 LLOYD M. FARNER, M.D.
Washington.

26 FORREST E. RIEKE, M.D.
Oregon.

27 JOHN E. KIRKPATRICK, M.D.
Northern California and Bay Area.

28 CLARENCE L. LLOYD, M.D.
Southern California.

29 FRANK HATLELID, M.D.
Territory of Hawaii.

30 W. HARVEY CRUICKSHANK, M.D.
Eastern Canada.

31 DOUGLAS R. WARREN, M.D.
Mid Canada.

32 WALTER SAUNDERS, M.D.
Western Canada.

COMMITTEES

By-Laws
E. A. IRVIN, M.D., Chairman
J. DUANE MILLER, M.D.
A. K. PETERSON, M.D.

Civil Defense
M. H. MANSON, M.D., Chairman
A. J. FLEMING, M.D.
R. E. MASTERS, M.D.
E. J. SCHOWALTER, M.D.

Education and Training
A. G. KAMMER, M.D., Chairman
JEAN S. FELTON, M.D.
O. T. MALLERY, JR., M.D.
L. C. MCGEE, M.D.
J. WISTER MEIGS, M.D.
IRVING R. TABERSHAW, M.D.
H. A. VONACHEN, M.D.

Foundation Activities
KIEFFER DAVIS, M.D., Chairman
JOHN L. NORRIS, M.D.
JOHN J. POUTAS, M.D.
G. R. ROWNTREE, M.D.

Health Achievement in Industry
J. F. MCCAHAN, M.D., Chairman
O. T. MALLERY, JR., M.D.

History Committee
A. H. WHITTAKER, M.D., Chairman
O. P. GEIER, M.D.
ROBERT T. LEGGE, M.D.
J. I. ROBERTS, M.D.
MCIVER WOODY, M.D.

Human Relations
NORMAN PLUMMER, M.D., Chairman
L. E. HINKLE, JR., M.D.
WILLIAM P. ECKES, M.D.
L. J. WADE, M.D.

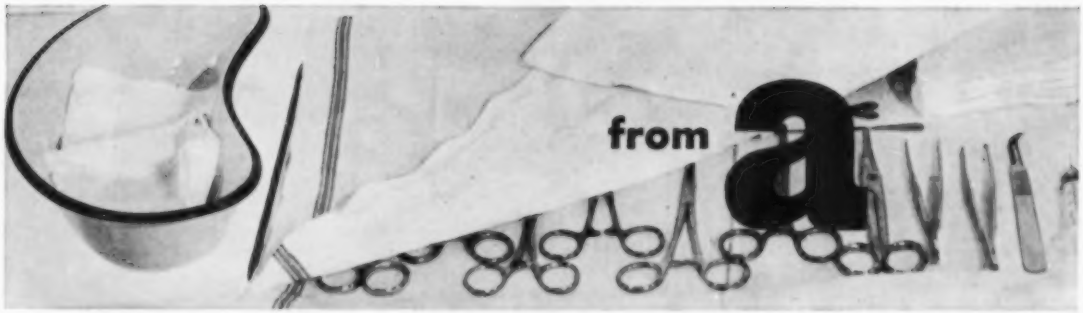
Knudsen Award
H. S. BROWN, M.D., Chairman
E. A. IRVIN, M.D.
M. H. KRONENBERG, M.D.

Medical Care Committee
W. A. SAWYER, M.D., Chairman
J. W. BROWN, JR., M.D.
LEO PRICE, M.D.
F. W. SLOBE, M.D.
D. S. THURBER, M.D.

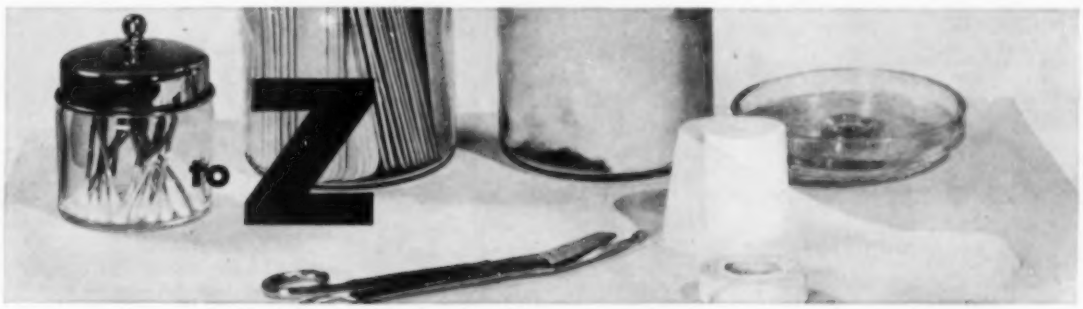
Membership Committee
C. F. SHOOK, M.D., Chairman
C. U. DERNEHL, M.D.
D. E. DORCHESTER, M.D.

Merit in Authorship Award Committee
C. P. MCCORD, M.D., Chairman
R. E. ECKARDT, M.D.
J. S. FELTON, M.D.
E. L. WALSH, M.D.

1955 IMA CONFERENCE, BUFFALO, APRIL 23-29, 1955



There is a use for ZEPHIRAN chloride throughout your office practice!



The same qualities that have made ZEPHIRAN outstanding as a broad spectrum germicide, in countless hospitals and laboratories, recommend it for...

- sterile storage of instruments, syringes, needles and catheters
- cleansing of small scalp and other wounds
- wet compresses on infected skin lesions
- wet dressing on burns

Supplied as Aqueous Solution 1:1000, bottles of 8 oz. and 1 U. S. gallon. Tincture 1:1000, tinted and stainless, bottles of 8 oz. and 1 U. S. gallon.

Concentrated Aqueous Solution 12.8%, bottles of 4 oz. and 1 U. S. gallon (1 oz. = 1 U. S. gallon 1:1000 solution), must be diluted.

it's antisepsis

with Zephiran®
CHLORIDE

WINTHROP

WINTHROP-STEARNS INC. New York 18, N. Y. Windsor, Ont.

Zephiran, trademark reg. U. S. Pat. Off., brand of benzalkonium chloride (refined)

I.M.A. COMMITTEES—Continued

Meritorious Service Award Committee
H. W. LAWRENCE, M.D., Chairman
E. C. HOLMELAD, M.D.
E. P. LUONGO, M.D.

Past Presidents Committee
E. A. IRVIN, M.D., Chairman
A. G. KAMMER, M.D.

Committee on Practice
P. J. BAMBERGER, M.D., Chairman
J. J. BRANDABUR, M.D.
FRANK E. GRAY, M.D.
R. T. JOHNSTONE, M.D.
R. EMMET KELLY, M.D.
CLARENCE L. LLOYD, M.D.
GEORGE O. NELSON, M.D.

Public Relations Committee
J. J. POUTAS, M.D., Chairman
C. E. DUTCHESS, M.D.
B. M. FREES, M.D.
R. EMMET KELLY, M.D.
J. F. SHRONTS, M.D.

Publications and Editorial
L. C. MCGEE, M.D., Chairman
R. F. BUCHAN, M.D.
D. R. WARREN, M.D.

Workmen's Compensation & Insurance
C. T. OLSON, M.D., Chairman
L. S. ARLING, M.D.
T. I. BOILEAU, M.D.
N. J. ROBERTS, M.D.
W. M. WEEDEN, M.D.

SCIENTIFIC COMMITTEES

General Scientific Committees
FRANK PRINCI, M.D., Chairman

Cardiovascular Diseases
D. V. HOLMAN, M.D., Chairman
J. J. BIELAWSKI, M.D.
R. B. CRANE, M.D.

Chest Diseases
A. J. VORWALD, M.D., Chairman
L. E. HAMLIN, M.D.
LEO PRICE, M.D.
O. A. SANDER, M.D.

Dermatology
J. V. KLAUDER, M.D., Chairman
F. C. COMBES, M.D.
J. G. DOWNING, M.D.
G. E. MORRIS, M.D.
LOUIS SCHWARTZ, M.D.

Geriatrics and Retirement
C. E. DUTCHESS, M.D., Chairman
R. B. ROBSON, M.D.
W. A. SAWYER, M.D.
H. E. TEBROCK, M.D.
R. LOMAX WELLS, M.D.
C. F. YEAGER, M.D.

Problem Drinking
R. G. BELL, M.D., Chairman
RONALD F. BUCHAN, M.D.
W. H. CRUICKSHANK, M.D.
PAUL A. DAVIS, M.D.
S. CHARLES FRANCO, M.D.
E. M. GUNN, M.D.
J. F. JELLEMA, M. D.
D. JOHN LAUER, M.D.
C. W. MCGILL, M.D.
S. S. PINTO, M.D.
J. I. ROBERTS, M.D.
J. W. SHILLING, M.D.
B. L. VOSBURGH, M.D.
E. L. WALSH, M.D.

Surgery of Trauma
A. H. WHITTAKER, M.D., Chairman
J. M. DEIOB, M.D.
F. B. MACMILLAN, M.D.
R. A. SUTTER, M.D.
J. L. THOMPSON, M.D.
J. HUBER WAGNER, M.D.

Toxicology
R. M. WATROUS, M.D., Chairman
D. W. FASSETT, M.D.
E. V. HENSON, M.D.
L. MASON LYONS, M.D.
L. W. SPOLYAR, M.D.

Personal

GEORGE EARL WIGHT, M.D., was recently appointed Director of Medical Services, Canadian Pacific Steamship Company and Canadian Pacific Railway Company, following the death of the late DR. CHARLES P. FENWICK. DR. WIGHT is a graduate of McGill University. He is a certified specialist in Internal Medicine, a lecturer in Medicine at McGill University, and has a distinguished record with the Royal Canadian Medical Corps in the Canadian Army Overseas. His headquarters address is Windsor Station, Montreal, Canada.

ANTHONY J. LANZA, M.D., internationally recognized for his pioneer work in the field of industrial medicine, has been appointed Professor Emeritus of New York University-Bellevue Medical Center's Post-Graduate Medical School. A faculty member since 1947, he is retiring at the end of this academic year. He has served as Professor and Chairman of the Department of Industrial Medicine and Director of the Center's Institute of Industrial Medicine. He will continue to act as a Consultant in Industrial Medicine and lend his support toward the development program of the Medical Center. Since receiving his M.D. from George Washington University, Washington, D.C., in 1906, DR. LANZA has held important posts in the United States government, as well as in private industry. While serving with the U.S. Public Health Service during and after World War I, he established 10 branches of the Office of Industrial Hygiene, and served two years each in the U.S. Coast Guard and the Tuberculosis Sanatorium in Fort Stanton, New Mexico, and five years as chief surgeon in the U.S. Bureau of Mines. In 1921 the International Health Board of the Rockefeller Foundation sent him to Australia, where he inaugurated the Division of Industrial Hygiene in the Federal Health Department of the Commonwealth government, and served as Adviser until 1924. From 1926 to 1947 he was Assistant, and then Associate, Medical Director of the Metropolitan Life Insurance Company. During World War II he served as a Colonel in the Medical Corps, and was head of the Division of Industrial Medicine, Preventive

New England Industrial Medical Association

Officers—1953-54

FRANK BARDEN, M.D., President
Saco Lowell Shops, Biddeford, Maine

KARL T. BENEDICT, M.D., Vice President
Norton Company, Worcester, Mass.

J. ALLAN THOMPSON, M.D., Secretary-Treasurer
New England Telephone and Telegraph Company
245 State Street, Boston, Mass.

Board of Directors—1953-54

PRESTON N. BARTON, M.D.
New Departure Div., General Motors
Bristol, Connecticut

HENRY F. HOWE, M.D.
The Procter & Gamble Company
Quincy, Massachusetts

ROBERT FLANDERS, M.D.
967 Elm Street, Manchester, N.H.

LEONARD LANDRY, M.D.
Simplex Wire & Cable Company
Cambridge, Massachusetts

ROBERT C. THOMPSON, M.D.
General Electric Company, Lynn, Mass.

Component Society of the Industrial Medical Association.

Rhode Island Society of Industrial Physicians and Surgeons

Officers

RICHARD F. MCCOART, M.D., President
Universal Winding Company, Cranston.

THOMAS A. EGAN, M.D., Vice-President
New Haven Railroad, Providence.

JAMES P. DERRY, M.D., Secretary
Division of Industrial Hygiene, State Department of Health, Providence.

ROBERT T. HENRY, M.D., Treasurer
Newman Crosby Company, Pawtucket.

Board of Directors

FRANK A. FERLIANO, M.D.
Providence Tuberculosis League, State of Rhode Island, Providence.

REMINGTON P. CAPWELL, M.D.
Whittet-Higgins Co., Providence.

EDWARD F. DOUHERTY,
Liberty Tool and Gauge Co., Providence.

JOSEPH C. JOHNSTON, M.D.
Texas Company, Providence.

CHARLES L. FARREL, M.D.
Collyer Insulated Wire Co., Pawtucket.

New York State Society of Industrial Medicine, Inc.

Officers

SAMUEL M. HYMAN, M.D., President
221 West 36th Street, New York City.

A. GLENNON FLAGG, M.D., Vice-President
440 West 34th Street, New York City.

MAURICE J. STONE, M.D., Secretary
1749 Grand Concourse, New York City.

JOHN J. BLACKFORD, Executive Secretary
70 Saratoga Avenue, Yonkers 5, New York.

Executive Council

The Industrial Doctor

(Reg. U.S. Pat. Off.)
Now combined with
INDUSTRIAL MEDICINE and SURGERY

Sedamyl® gently relieves anxiety and tension generated by social pressure and personal tragedy. Why? Sedamyl is an "unusually safe and practical"[1] non-barbiturate sedative. Patients on Sedamyl stay alert, stay out of the barbiturate fog, avoid the groping travel between hypnosis and hangover. In fact, 9 out of 10 may get smooth yet decisive relief from anxiety and tension[1]... and never experience lethargy or letdown during or after Sedamyl sedation.

sedate with SEDAMYL®

(ACETYLBROMDIETHYLACETYLCARBAMID, SCHENLEY)

relax anxiety, transform tension into a smile

Each Sedamyl tablet provides 0.26 Gm. (4 gr.) acetylbromdiethylacetylcarbamid, Schenley.

1. Tebrock, H. E.: M. Times 79:760, 1951.

Schenley Laboratories, Inc., *New York 1, New York*

Western Industrial Medical Association

Officers

HOMER S. ELMQUIST, M.D., President
629 S. Westlake Avenue, Los Angeles 5.
PACKARD THURBER, JR., M.D., Vice-President
111 West 7th St., Los Angeles 14.
EDWARD J. ZAIK, M.D., Secretary
The Pacific Telephone & Telegraph Co.,
740 South Olive Street, Los Angeles 14.
CLARENCE L. LLOYD, M.D., Treasurer
Medical Director, North American Aviation, Inc., Los Angeles 45.
ELIZABETH SCHEUNER, Assistant Secretary
The Pacific Telephone & Telegraph Co.,
740 South Olive Street, Los Angeles 14.

Directors—1955

VERNE G. GHORMLEY, M.D.
3032 Tulare Street
Fresno, California.
DOUGLAS D. MCKINNON, M.D.
Medical Square Bldg. No. 1
2200 W. Third Street
Los Angeles 5, California.

Directors—1956

FORREST E. RIEKE, M.D.
210-A N.E. Oregon Street
Portland 14, Oregon.
A. C. REMINGTON, M.D.
9851 Sepulveda Boulevard,
Los Angeles 45, California.

Directors—1957

L. E. CURTIS, M.D.
225 Bush Street
San Francisco 20, California.
JOHN S. STEPHENS, M.D.
Medical Office, Dept. of Water & Power, Box 3669, Terminal Annex,
Los Angeles 54, California.
DAN O. KILROY, M.D.
3300 Third Avenue
Sacramento 17, California.

Central States Society of Industrial Medicine and Surgery

Officers

President
DONALD C. CONZETT, M.D., Dubuque, Iowa.
President-Elect
J. M. L. JENSEN, M.D., Chicago.
Vice-President
ELI S. JONES, M.D., Hammond, Indiana.
Secretary-Treasurer
CHARLES DRUECK, M.D., 28 East Jackson Blvd., Chicago 4, Illinois.
Program Chairman
LEONARD ARLING, M.D., Minneapolis.
Program Co-Chairmen
EDWARD SCHOWALTER, M.D., Chicago.
JOHN F. SHRONTS, M.D., Minneapolis.

Board of Governors

1954—LEONARD ARLING, M.D., Minneapolis.
LLOYD E. HAMLIN, M.D., Chicago.
ELI S. JONES, M.D., Hammond.
MILTON H. KRONENBERG, M.D., Peoria.
EMMETT B. LAMB, M.D., Indianapolis.
1955—DANIEL E. DORCHESTER, M.D., Sturgeon Bay, Wisconsin.
H. GLENN GARDINER, M.D., East Chicago, Indiana.
FRANK G. OBER, M.D., Burlington, Iowa.
EDWARD SCHOWALTER, M.D., Chicago.
RICHARD A. SUTTER, M.D., St. Louis.
1956—ELSTON L. BELKNAP, M.D., Milwaukee.
CHARLES A. CIBELIUS, M.D., Rockford, Illinois.
BURTON C. KILBOURNE, M.D., Chicago.
ARTHUR K. PETERSON, M.D., Chicago.
THEODORE J. SMITH, M.D., Whiting, Indiana.

Component Society of the Industrial Medical Association.

Medical Service, in the office of the Surgeon General of the Army. At the close of World War II, he received the William S. Knudsen Award for his contribution to the field of industrial medicine in the United States Army. He holds numerous memberships in national and international organizations, as well as being an adviser in industrial medicine to many industries. He recently was named Chairman Emeritus of the American Medical Association's Council on Industrial Health.

MERLE BUNDY, M.D., has been appointed Pittsburgh Works Physician for Jones and Laughlin Steel Corporation, of which D. JOHN LAUER, M.D., is Medical Director. DR. BUNDY succeeds CARL W. GATTER, M.D., who has been appointed Assistant to the Medical Director for Special Health Projects. DR. BUNDY was born in Salem, Indiana, in 1918. He is a graduate of Indiana University (1939) and its School of Medicine (1942). From 1943 to 1947 he was attached to the U.S. Public Health Service. Part of this period was spent in Coast Guard duty at sea and part in tuberculosis control activities for the State of Indiana. During this period he attended the University of Michigan, where he received the degree of Master of Public Health. In 1951 he left his position as Director of the Tuberculosis Control Division of the Indiana State Board of Health to join the Pittsburgh Department of Public Health as Chief of the Tuberculosis Control Division. Later he became Chief of the Bureau of Preventive Medicine of Pittsburgh's Department of Public Health. He is widely known for his work in tuberculosis control, and is a recognized authority in preventive medicine.

THE MINNESOTA Academy of Occupational Medicine and Surgery, which now has 56 members, held its First Annual Meeting on May 26, 1954, at the Minneapolis Athletic Club. At a business session after the 7:00 P.M. dinner, JOHN SHRONTS, M.D., Medical Director, General Mills, Inc., Minneapolis, was named President of the organization to succeed WILFORD E. PARK, M.D., Industrial Physician, Minneapolis Health Department, Minneapolis. The other 1954-55 officers will be: Vice-President—LESLIE W. FOKER, M.D., Minneapolis; Secretary—JAMES FOX, M.D., Minneapolis;

Florida Association of Industrial and Railway Surgeons

Officers

JOHN H. MITCHELL, M.D., President
241 W. Ashley St., Jacksonville
LLOYD J. NETTO, M.D., President-Elect
416 Coneau Bldg., West Palm Beach
P. J. MANSON, M.D., Vice-President
8037 N.E. 2nd Ave., Miami
JOHN H. MITCHELL, M.D., Secretary-Treasurer
24 W. Ashley St., Jacksonville

Directors

F. H. BOWEN, M.D.
2000 Park St., Jacksonville
V. A. LOCKWOOD, M.D.
East Coast Hospital, St. Augustine
F. D. GRAY, M.D.
12 N. Rosalind Ave., Orlando
J. C. DAVIS, M.D.
P.O. Box 465, Quincy

Component Society of the Industrial Medical Association.

Association of Mine Physicians

Officers

GEO. W. EASLEY, M.D., President
Williamson, West Virginia.
E. M. HOWARD, M.D., Vice-President,
Harlan, Kentucky.
J. C. LAWSON, M.D., Secretary-Treasurer,
Williamson, West Virginia.
W. R. LUNDY, Executive Secretary,
Offices: Williamson, W. Va.
Pineville, Ky.

Committee on Organization

R. O. ROGERS, M.D., Chairman,
Bluefield, W. Va.
C. L. HARSHBARGER, M.D., Norton, Va.
CARL E. AUSMUS, M.D., Jellico, Tenn.
J. A. BENNETT, M.D., Algoma, W. Va.
J. C. MOORE, M.D., Keen Mountain, Va.
T. M. PERRY, M.D., Jenkins, Ky.
P. E. BLACKBERRY, M.D., Louisville, Ky.
CARL A. GROTE, M.D., Huntsville, Ala.
C. N. CARRAWAY, M.D., Birmingham, Ala.

Component Society of the Industrial Medical Association.

Industrial Medical Ascoiation of Philadelphia

Officers

F. B. LANAHAN, M.D., President
Electric Storage Battery Company
Philadelphia
WILLIAM D. FRAZIER, M.D., President-Elect
The Baldwin-Lima-Hamilton Corp.
Eddystone, Pennsylvania
NORBERT J. ROBERTS, M.D., Secretary
Pennsylvania Railroad
1617 Pennsylvania Blvd.
Philadelphia
ALBERT J. SNYDER, M.D., Treasurer
Newton Square, Pennsylvania

Directors

HEINRICH BRIEGER, M.D.
Jefferson Medical College
Philadelphia
LAURENCE P. DEVLIN, M.D.
Philadelphia Quartermaster Depot
Philadelphia
GLENN S. EVERTS, M.D.
Curtis Publishing Company
Philadelphia
HOWARD J. JOHNSON, M.D.
Philadelphia Gas Works
Philadelphia
HAROLD LEFKOE, M.D.
John H. Mathis Company
Philadelphia
LEMUEL C. MCGEE, M.D.
Hercules Powder Company
Wilmington, Delaware
ALBERT J. SNYDER, M.D.
Newton Square, Pennsylvania

Component Society of the Industrial Medical Association.

new
dermatologic
principle

topical anticholinergic for skin disorders...

PRANTAL CREAM 2%

50 Gm. tube

for local control of pruritus, sweating

**rapid relief in contact dermatitis,
atopic eczema, dyshidrotic eczema,
neurodermatitis, hyperhidrosis,
and poison ivy dermatitis**

PRANTAL® Methylsulfate
(brand of diphenmethanil
methylsulfate)

Schering

PRANTAL CREAM 2%
new dermatologic principle

★ AMERICAN ASSOCIATION OF RAILWAY SURGEONS ★

Officers

President:
WILLIAM G. BESSMER, M.D., Davenport, Iowa.
President-Elect:
RICHARD A. SUTTER, M.D., St. Louis.
Vice-Presidents:
B. W. STOCKWELL, M.D., Detroit.
LEE R. MARTIN, M.D., Council Bluffs, Iowa.
JOSEPH R. GANDY, M.D., Houston.
Recorder:
JAMES K. STACK, M.D., Chicago.
Treasurer:
THEODORE L. HANSEN, M.D., 139 West Van Buren, Chicago 5, Wabash 2-3200, Ext. 220.

Executive Board

ARTHUR R. METZ, M.D., Chairman, Chicago
ROBERT M. GRAHAM, M.D., Chicago.
ALEXANDER M. W. HURSH, M.D., Philadelphia.
RAYMOND B. KEFNER, M.D., Chicago.
E. C. OLSON, M.D., Chicago.
RAY S. WESTLINE, M.D., Chicago.
Secretary:
CHESTER C. GUY, M.D., 5800 Stony Island Ave., Chicago 37, Midway 3-9200.
Secretary-Treasurer:
H. S. DEWHURST, M.D., Chicago.

67th Annual Meeting, April 12-14, 1955, at the Drake Hotel, Chicago

Territorial Association of Plantation Physicians

Officers

President
GARTON E. WALL, M.D.
Ewa Hospital, Ewa, Oahu
Vice-President
J. ALFRED BURDEN, M.D.
Paia, Maui
Secretary-Treasurer
H. M. CHANDLER, M.D.
Waipahu Hospital, Waipahu, Oahu
Executive Secretary
MRS. JEANNETTE WILKINSON, 1133 Punchbowl St., Honolulu, Oahu, T.H.
Component Society of the Industrial Medical Association.

Industrial Medical Association of New Jersey

Officers

THOMAS M. THOMPSON, M.D., President
Johnson and Johnson, New Brunswick.
J. H. WOLFSIE, M.D., Vice-President
American Cyanamid Company, Linden.
W. D. VAN RYZER, M.D., Secretary
Johnson and Johnson, New Brunswick.
GEORGE C. FREEMAN, M.D., Treasurer
Prudential Insurance Company, Newark.

Board of Directors

RALPH A. YOUNG, M.D.
General Motors Corporation, B. O. P. Assembly Division, Linden.
L. HOLLAND WHITNEY, M.D.
New Jersey Bell Telephone Company. 763 Broad Street, Newark.
GEORGE A. PAUL, M.D.
Hyatt Roller Division, General Motors Corporation, Harrison.
Component Society of the Industrial Medical Association.

Chicago Society of Industrial Medicine and Surgery

Officers

WILL F. LYON, M.D., President
DONALD B. KNOWLES, M.D., Vice-President
CORNELIUS M. ANNAN, M.D., Program Chairman
CHARLES DRUECK, M.D., Secretary-Treasurer

Board of Directors

Terms to Expire 1954:
KARL G. RUNDSTROM, M.D.
CARLO SCUDERI, M.D.
EUGENE L. WALSH, M.D.
Terms to Expire 1955:
BILLS HENNAN, M.D.
JOHN R. MERRIMAN, M.D.
WALTER J. PHILLIPS, M.D.
Terms to Expire 1956:
GEORGE W. BOHR, M.D.
FRANCIS J. HRDJSA, M.D.
KENNETH E. SHERMAN, M.D.

Treasurer—TRACY BARBER, M.D., Austin, Minnesota; Recorder—GORDON MACRAE, M.D., Duluth; Executive Committee Member for two years—H. E. DRILL, M.D., Hopkins, Minnesota; continuing in the second year of his two-year term as Executive Committee Member—EDWIN G. BENJAMIN, M.D., Minneapolis. A scientific paper, "General Problems of the Heart and Pre-employment Examinations," was presented by A. C. KERKHOF, M.D., Cardiologist, Minneapolis.

FRITJOF H. ARESTAD, M.D., Associate Secretary of the A.M.A. Council on Medical Education and Hospitals, has resigned in order to accept appointment with the Welfare and Retirement Fund of the United Mine Workers of America. DR. ARESTAD will assume his duties as Medical Administrator of the Johnstown, Pennsylvania, area on July 1. He has been associated with the hospital work of the Council since 1928, and during his 25 years of service has engaged in activities related to the registration of hospitals, approval of internships and residencies, and the standardization of technical schools.

EMPLOYEE Health, Industrial Wealth" was the title of a health forum television broadcast from New York City, May 9, 1954. The participants in addition to the announcer were R. C. PAGE, M.D., President, Industrial Medical Association; SARA P. WAGNER, R.N., President, American Association of Industrial Nurses; HERBERT T. WALWORTH, President, American Industrial Hygiene Association; and LEONARD S. MORVAY, D.D.S., American Association of Industrial Dentists.

Michigan Industrial Medical Association

Officers

LYNDLE R. MARTIN, M.D., President
The Detroit Edison Co., 2000 Second Ave., Detroit
PAUL J. OCHSNER, M.D., President-Elect
401 Verlinden Ave., Lansing 4
M. W. SHELLMAN, M.D., Vice-President
Metz Building, Grand Rapids
WILLIAM J. FULTON, M.D., Secretary-Treasurer
General Motors Building, Detroit

Board of Directors

THORNTON I. BOILEAU, M.D., Detroit
OTTO J. PRESTON, M.D., Flint
JOSEPH L. ZEMENS, M.D., Detroit
Component Society of the Industrial Medical Association.

Kansas City Industrial Medical Association

Officers

TERRY E. LILLY, JR., M.D., President
915 Argyle Bldg., Kansas City 6, Mo.
DOYLE C. WHITMAN, M.D., Vice-President
Sharp Building, Kansas City, Mo.
JAMES J. LALLY, M.D., Secretary-Treas.
1207 Rialto Building, Kansas City, Mo.

Directors

HORACE F. FLANDERS, M.D.
SOLAN E. HAYES, M.D.
W. J. FWEHAN, M.D.
Component Society of the Industrial Medical Association.

American Association of Industrial Dentists

Officers

ERNEST G. SMITH, D.D.S., President
Dental Director, Tennessee Valley Authority, Wilson Dam, Alabama
GRANT U. MACKENZIE, D.D.S., President-Elect, Dental Director, Ford Motor Company, Dearborn, Michigan
GUY C. KIRBY, D.D.S., Treasurer
Dental Director, Pratt-Whitney Aircraft, East Hartford, Connecticut
EDWARD R. ASTON, D.D.S., Secretary
Industrial Dental Consultant
Pennsylvania Department of Health
Harrisburg, Pennsylvania

Directors

FRANCIS J. WALTERS, D.D.S., Chairman
Senior Dental Surgeon, U.S. Public Health Service, Washington 25, D.C.
RICHARD V. WILLS, D.D.S., 1954
Dental Director, Farm Bureau Insurance Company, Columbus, Ohio
HOWARD E. DECAMP, D.D.S., 1955
Dental Director, Corning Glass Works, Corning, New York
DONALD W. HENRY, D.D.S., 1955
Dental Director, Molson's Brewery, Montreal 25, Canada
KENNETH W. MISHER, D.D.S., 1956
Dental Director, International Harvester Company, 185 North Wabash Avenue, Chicago, Illinois

RESULTS FAR SUPERIOR IN HAY FEVER

In more than 92% of 102 patients in one study, "... results obtained with PHENERGAN in symptomatic relief of pollen hay fever were far superior to those obtained with any other antihistaminic agent."[1] Side effects were negligible; single, individualized doses were effective for periods of from four to 24 hours.[1]

The allergic patient, exhausted by the sneezing, rhinitis and lacrimation of hay fever, can be restored to *comfortable* living with PHENERGAN.

1. Silbert, N. E.: Ann. Allergy *10*:328-334 (May-June) 1952

Supplied:
Tablets—12.5 mg. per tablet; bottles of 100
Syrup—6.25 mg. per teaspoonful (5 cc.); bottles of 1 pint

Phenergan®

Hydrochloride

PROMETHAZINE HYDROCHLORIDE

Wyeth®
PHILADELPHIA 2, PA.

CLARK D. BRIDGES joined the staff of the American Medical Association Council on Industrial Health on June 1, 1954. His will be the area of new scientific developments, research and its application, clearing house services, and liaison with allied non-medical scientific bodies, with special attention to rehabilitation and job analysis in the employment of handicapped workers. His past experience will provide helpful contacts with official agencies in the fields of industrial hygiene, safety, nursing, personnel work, and casualty insurance. MR. BRIDGES is a charter member of the American Industrial Hygiene Association and was the first President of its Chicago Section. He is also a member of the American Society of Safety Engineers, the Veterans of Safety, and the President's Committee on Employment of the Physically Handicapped. During the past 10 years he has been head of safety engineering, industrial hygiene, and health and safety education services for the Zurich-American Insurance Companies, Chicago. He is probably best known for his teaching of hygiene and safety subjects, and for his research in techniques for employing disabled workers. His book, "Job Placement of the Physically Handicapped," is a standard reference in this field.

EARLE A. IRVIN, M.D., has been appointed Medical Director of Ford Motors Company, effective July 1, 1954. He will have over-all responsibility for the company Medical Program at all Ford organizations in the United States. He joins Ford after 19 years with General Motors, including the last 12 years as Medical Director of the Cadillac Division. A native of Linton, North Dakota, DR. IRVIN entered the University of Michigan Medical School in 1929, after three years of premedical study in the University of North Dakota. He received his M.D. from Michigan in 1933, and served his internship at Hurley Hospital, Flint, in 1933-34. He has devoted his entire professional life to industrial medicine; was President, 1952-53, of the Industrial Medical Association, international organization of industrial physicians.

AT THE Post Graduate Course on Industrial Medicine at Habana University Summer Session, from July 17 to August 28, under the direction of DRS. JOSE A. BRYON, RAFAEL PENALVER, and MARCELO DE CATURLA, there will be a Symposium on "Manganism." As in previous years, it is expected that doctors from different Latin American countries will attend.

Cancer Research

IN FURTHERANCE of its investigation of the effects of tobacco smoking, the Tobacco Industry Research Committee has invited university, hospital, and other medical research organizations throughout the nation to submit proposals for specific cancer research projects for consideration by the Committee's Scientific Advisory Board. An initial fund of $500,000 for research has been appropriated by the Committee, which is composed of major cigarette manufacturers, tobacco growers, and warehousemen. On the advice of the Scientific Advisory Board, the Committee has also pledged to vote substantial additional funds for specific projects. The tobacco industry, it is said, will not set up any research facilities but will conduct its long-term research program in institutions outside the industry. No industry funds will be given to tobacco company laboratories. The committee invites (1) information concerning facilities and personnel available for the production of such research, and (2) suggestions from qualified investigators for the specific planning of projects. Suggestions for research should be sent to DR. CLARENCE COOK LITTLE, The Tobacco Industry Research Committee, 5400 Empire State Bldg., New York. —*J.A.M.A.*, June 19, 1954.

The Industrial Nurses

WHILE ANA members apportioned their time among the Conrad Hilton Hotel, the Palmer House, and the Coliseum, in Chicago, some 500 members of the American Association of Industrial Nurses were busy keeping pace with their own convention schedule at the Hotel Sherman in the same city. Holding their meetings in conjunction with those of allied professional groups, AAIN nurses were offered a varied program on problems related to their specialty. In their business meetings they heard encouraging reports of progress, especially on membership which has increased from 3,515 in December, 1953, to 4,123 in April, 1954. Another sign of progress was the Statement of Principles to Govern Manager-Nurse Relationships developed by AAIN's Management Advisory Council. Two years ago the Management Advisory Council conducted a fund raising campaign to keep AAIN solvent. This year the AAIN thanked the Council and stated that the Association could now support its own program. As a further sign of expansion, the publication of AAIN has grown from a four-page newsletter to a 32-page Journal. Elected to AAIN office were: GERTRUDE A. STEWART, International Business Machines Corporation—First Vice-President; MRS. MARGARET L. STEELE, American Brake Shoe Company—Third Vice-President; MRS. MARGARET W. LUCAL, The Ohio Rubber Company—Treasurer; and MARION CASTRODALE, Upjohn Company—Recording Secretary. Elected Directors include: ABSLEY MCCELLAN, Sonoco Products Company; NELDA CALDWELL, International Paper; HELEN DE COURSEY, Kelsey Hayes Wheel Company; HELEN T. DUBBS, Minnesota-Honeywell Regulator, Brown Instrument Division; JOSEPHINE KINMAN, Industrial Nursing Consultant; and MARJORIE SCHMIDT, Esso Research Center.

—From *RN*, June, 1954.

Recent Deaths

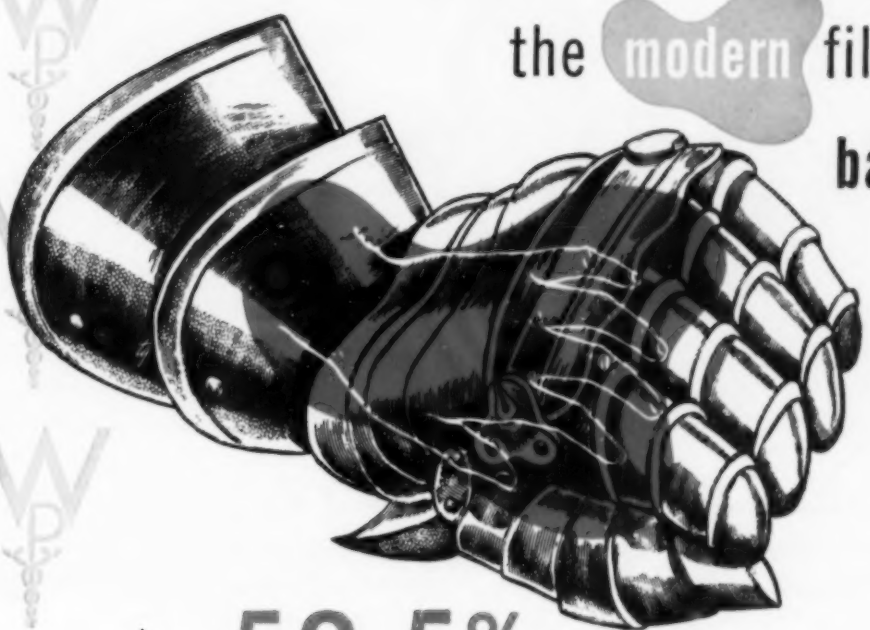
GERALD J. WALSH, M.D., 48, at Miami, Florida, in February. DR. WALSH graduated M.D. at McGill University in 1937; was Surgeon for the Florida East Coast Railway; partner, Walsh-Fisher-Ryon Medical Center.

DR. MANUEL GARCIA AVILA, 54, President of the "Sociedad Cubana de Medicina del Trabajo," at Habana, May 28. DR. AVILA was a member of the Industrial Medical Association; and a member of the Comision Internacional de Medicina del Trabajo. He was Director of the Cuban Rehabilitation Center; Professor of Industrial Medicine, at Habana University Summer Session; President of the Section of Occupational Medicine at the Cuban National Safety Council; author of numerous articles on Industrial Medicine (in Spanish); leader in the field of lead poisoning in Cuba. DR. AVILA was recently working with other Cuban doctors in "Manganism," concerning which a preliminary report was published in *Industrial Medicine and Surgery*, May, 1953.

Pro·derna SILICONE

skin protective cream

the modern film barrier



52.5% silicone makes the difference

ONLY *Pro·derna* **contains about 2 to 20 times more free silicone than any other product available—chemically inert, flexibl greaseless, water and oil repellent.**

prevents contact dermatitis

from: water • soap • household cleansers • wool
saliva • urine • rectal and vaginal discharge
cotton • oils • rust preventatives • fuels
inspection fluids • alkalis • acids • paints

Does not sensitize or irritate

Easily removed with LOWILA cake

Available at pharmacies in 1 oz. tubes and 1 lb. jars

SAMPLES ON REQUEST

Westwood Pharmaceuticals • 468 Dewitt Street, Buffalo 13, N.Y.

DIVISION OF FOSTER-MILBURN CO.

Safe...Effective...Therapy in Lead Poisoning without Organ Injury during Excretion

- Solution Calcium Disodium Versenate is the calcium chelate of ethylenediamine tetraacetic acid (EDTA). In the body calcium is displaced by lead, forming the lead chelate—nonionized—nontoxic—water-soluble—nonmetabolized—and excreted intact.
- Indicated for the reduction of blood and depot lead in acute or chronic lead poisoning and lead encephalopathy...
- For prevention of exacerbations in chronic lead poisoning.
- Worthy of trial in mercury and other heavy metal poisoning and for removal of radioactive and nuclear fission products.
- For intravenous use in proper dilution only.
- Available in boxes of six 5 cc. ampuls, each containing 1 gram. Instructions with each ampul. Literature on request.

Hardy, H.A., et al.: Calcium Ethylenediamine-tetraacetate in Treating Heavy Metal Poisoning, A.M.A. Arch. Indust. Hyg. 7:137 (1953).

*Versenate is the registered trademark of the Bersworth Chemical Company.

RIKER LABORATORIES, INC. 8480 BEVERLY BLVD. • LOS ANGELES 48, CALIF.

for antihistaminic action with minimum sedation

prescribe **NEOHETRAMINE**

The driver of an automobile, the child in school, and the office worker must maintain alertness during antihistamine therapy. For the ambulatory therapy of allergies, NEOHETRAMINE provides effective control of symptoms with a minimum of sedation. For this reason, it is widely prescribed in industrial medicine where dizziness or drowsiness would be most dangerous.

FOR CHILDREN

prescribe pleasant tasting

NEOHETRAMINE SYRUP

alone or as a vehicle for other medication

DOSAGE:

Adults, 50 to 100 mg., two to four times daily. Children, 25 mg., two to four times daily.

Some patients will require larger dosage. Because of the wide margin of safety of Neohetramine, dosage may be gradually and cautiously increased until a therapeutic effect is obtained or side effects appear. In the great majority of cases, the therapeutic dosage will not cause uncomfortable side effects.

SUPPLIED:

In tablets of 25 mg., 50 mg., 100 mg., in bottles of 100 and 1,000. Syrup, 25 mg. per teaspoonful (4 cc.) in pints and gallons. Cream, 2%, in one ounce tubes.

when alertness is all-important

NEOHETRAMINE®

Hydrochloride

Brand of Thonzylamine Hydrochloride

NEPERA CHEMICAL CO., INC.

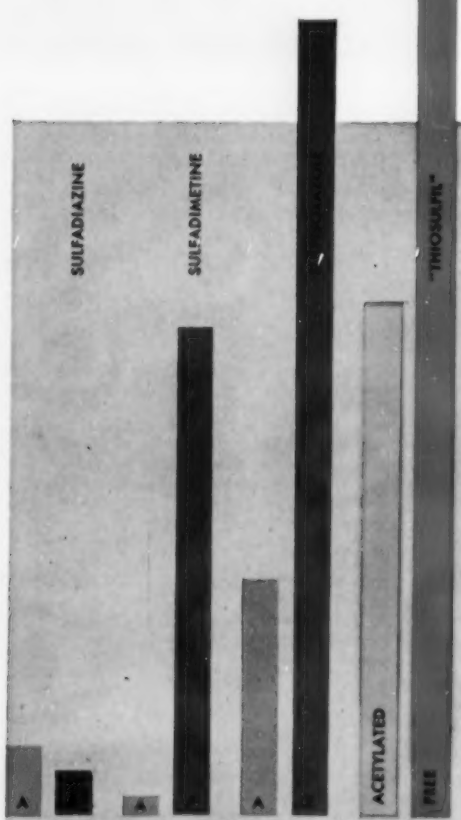
Pharmaceutical Manufacturers • Nepera Park • Yonkers 2, N. Y.

SUITABILITY *depends upon* SOLUBILITY

Laboratory studies have demonstrated the greater solubility of "Thiosulfil" as compared with the other three leading sulfonamides prescribed in urinary tract infections.
This obvious advantage, added to high bacteriostatic activity and a low acetylation rate makes

"THIOSULFIL"

the safest and most effective sulfonamide yet presented for urinary tract infections



Solubility comparison at pH 6 in human urine at 37° C.

- Rapid transport to site of infection for early and effective urinary concentration
- Rapid renal clearance
- Minimum toxicity
- Minimum risk of sensitization
- No alkalinization required
- No forcing of fluids

"THIOSULFIL"®

Brand of sulfamethylthiadiazole

SUSPENSION	TABLETS
No. 914 —	No. 785 —
0.25 Gm. per 5 cc.	0.25 Gm. per tablet
Bottles of 4 and 16 fluidounces	Bottles of 100 and 1,000

New York, N. Y. • Montreal, Canada

Ayerst

5403

LEGS AND FEET

feel better—look better with **ACE**®

full-footed elastic hosiery for men

Handsome, comfortable and therapeutically correct, **ACE** Elastic Hosiery provides the first *full-footed* elastic hose for men who require support of leg structures. Your patients will cooperate more readily when you specify **ACE** Elastic Hosiery for Men, for these smart-looking, knee-length hose not only resemble regular nylon socks, but also *eliminate the need for overhose.*

Available in burgundy color — 4 foot sizes: 10, 11, 12 and 13.

ACE and B-D, T.M. Reg. U. S. Pat. Off.

B-D

BECTON, DICKINSON AND COMPANY, RUTHERFORD, NEW JERSEY

SAFETY

one of many considerations in...

PAX-LANO-SAV HEAVY DUTY

GRANULATED INDUSTRIAL SKIN CLEANSER

Mildness is the most obvious but not the most important element of safety in an Industrial Skin Cleanser. Complete effectiveness is also an essential requirement. Factory workers don't scrub like surgeons but primary irritants and sensitizers of industrial origin must be removed. Speed cannot be overlooked. Workers are often hasty—slow acting skin cleansers can lead to slighted wash-ups. Achieving these all-important considerations, an industrial skin cleanser must still be mild lest it become a cause rather than a preventative of skin irritation. Send today for a free sample on your letterhead and see how all these considerations have been satisfied by PAX-LANO-SAV HEAVY DUTY Granulated Industrial Skin Cleanser.

PAX

LOOK for the PAX ROOSTER for it's Your Assurance of a Superior Product

ACCEPTED COMMITTEE ON COSMETICS AMERICAN MEDICAL ASSOCIATION

PAX-LANO-SAV HEAVY DUTY has been awarded the Seal of Acceptance of the American Medical Association Committee on Cosmetics. 54-P

G. H. PACKWOOD MANUFACTURING CO.

Manufacturing Chemists

1532 TOWER GROVE AVE. • ST. LOUIS 10, MO.

a favorite

prescription

the year 'round

to **accelerate**

healing

DESITIN ointment

the pioneer external **cod liver oil** therapy

New impressive studies[1] again confirm the clinical value[2-4] of Desitin Ointment to protect, soothe, facilitate healthy granulation, and speed healing even in stubborn skin conditions often resistant to other therapy.

in **wounds • burns • ulcers** (decubitus, varicose, diabetic)

diaper rash • intertrigo

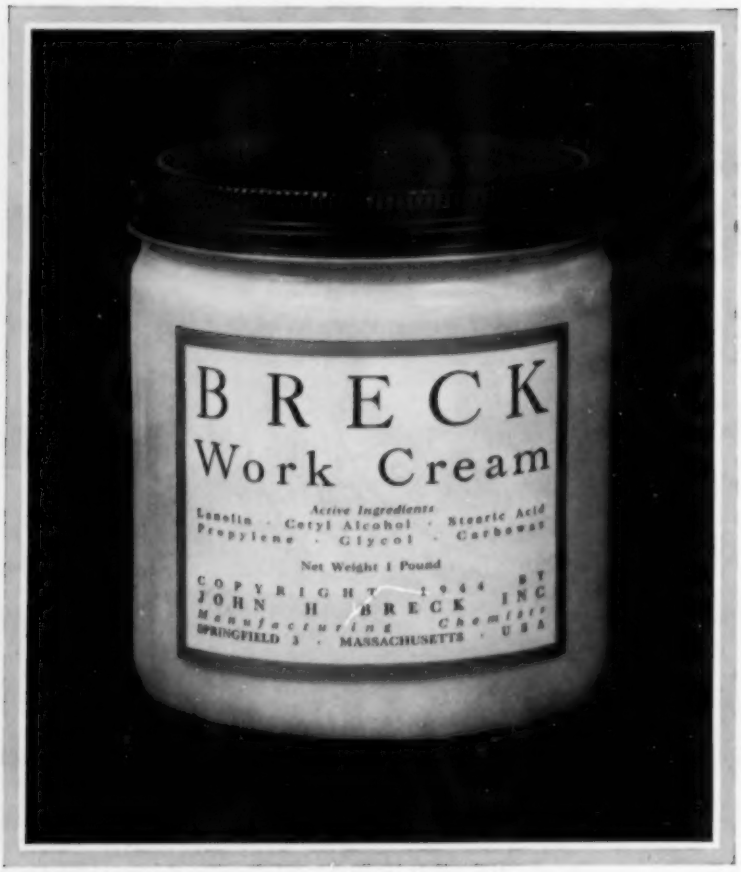
non-specific dermatoses • perianal dermatitis

Protective, soothing, healing, Desitin Ointment is a non-irritating, non-sensitizing blend of high grade Norwegian cod liver oil (with its unsaturated fatty acids and high potency vitamins A and D in proper ratio for maximum efficacy), zinc oxide, talcum, petrolatum, and lanolin. Desitin Ointment does not liquefy at body temperature and is not decomposed or washed away by secretions, exudate, urine or excrements. Dressings easily applied and painlessly removed. Tubes of 1 oz., 2 oz., 4 oz., and 1 lb. jars.

samples and reprint[1] on request

DESITIN CHEMICAL COMPANY
70 Ship Street, Providence 2, R. I.

1. Grayzel, H. G., Heimer, C. B., and Grayzel, R. W.: New York St. J. M. 53:2233, 1953.
2. Heimer, C. B., Grayzel, H. G., and Kramer, B.: Archives of Pediatrics 68:382, 1951.
3. Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Ind. Med. & Surgery 18:512, 1949.
4. Turell, R.: New York St. J. M. 50:2282, 1950.



B R E C K

W O R K C R E A M

The use of solvents and other degreasing materials in many industrial processes often results in workers' hands becoming dry, chapped, cracked or otherwise defatted. Such a condition can lead to a serious skin irritation. Breck Work Cream is applied after exposure to degreasing materials to temporarily substitute fatty materials for the natural skin oils which have been removed. In this way Breck Work Cream helps keep hands smooth, pliable and lubricated. Breck Work Cream also helps protect the skin against external irritants until the natural protective barrier of skin oils is replenished.

A Breck Industrial Preparations Booklet will be forwarded to you upon request.

JOHN H BRECK INC · MANUFACTURING CHEMISTS · SPRINGFIELD 3 MASSACHUSETTS
NEW YORK · CHICAGO · SAN FRANCISCO · OTTAWA CANADA

SACRO-MATIC

TREATMENT TABLE

- For Low Back Pain and Sprains and Strains of Industrial Workers

Shortens Disability

Helps Keep Workers on the Job...

In the treatment of painful muscular sprains and strains, Sacro-Matic electrically-controlled Treatment Table offers a quick, safe means of applying heat to affected areas. Keeps workers on active duty.

Sacro-Matic's two heating pads, oscillating in synchronized or alternating movements, produce deep heating. Both heat and oscillation of pads are automatically adjusted to tolerance of individual patient.

Sacro-Matic requires little attention to operate. Once the patient is in position on the table, thermostatic heat control and timer are set and no further attention is required during the treatment period.

Reduce absenteeism in your plant. Bring quick relief to distressed workers with Sacro-Matic. *No purchase of expensive equipment necessary. Sacro-Matic is available for industrial service on a reasonable rental basis.*

AMONG THE MANY CONDITIONS RELIEVED BY THE MOVABLE WARMTH OF SACRO-MATIC'S HEATED PADS ARE:

- LOW BACK PAIN
- DISTURBANCES OF THE SHOULDER GIRDLE
- TRAUMATIC BACK
- MUSCULO-SKELETAL DYSFUNCTION
- POSTURAL DISORDERS
- MUSCLE SPASM

Patients on the Sacro-Matic can tolerate a higher degree of heat, be relieved more quickly, because Sacro-Matic's heat is from a movable rather than a stationary source.

Designed and engineered at Ohio State University. 77" long; 17½" high; 25½" wide. Frame: All steel welded construction. Deep green enamel finish.

Use this handy coupon for complete details

SACRO-MATIC, INC.

P. O. Box 83, Darien, Connecticut

Please send, without obligation, brochure on

- ☐ Physiologic Response to Sacro-Matic Therapy.
- ☐ Treatment of Low Back Pain and "Industrial Back."
- ☐ Description and Uses of Sacro-Matic Treatment Table.

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

SACRO-MATIC, INC.

Box 83

DARIEN, CONNECTICUT

always in season

Sprains and strains . . .
Soreness and stiffness of muscles . . .
Neuralgia, arthralgia and kindred rheumatic pains . . .
Irritations and eruptions of the skin . . .

IODEX cum Methyl Salicylate

combines the stimulating and metabolic effects of iodine in Iodex and the analgesic action of methyl salicylate.

Absorption through the skin may be aided by massage, heat or iontophoresis.

Samples and literature cheerfully sent upon request.

MENLEY & JAMES, LTD., 70 WEST 40TH ST., N. Y. 18

TO PREVENT LOST TIME FROM SURFACE INFECTIONS

Furacin® *a proven antibacterial*

brand of nitrofurazone, Eaton

Furacin—designed for external use only—produces truly outstanding results both in prophylaxis and therapy.

- wide range topical antibacterial therapy
- negligible toxicity for human tissues
- minimizes malodor of infected lesions
- effective in the presence of pus
- dissolves in exudates
- stable

burns
wounds
ulcers
pyodermas
skin grafts

ALL THREE FORMS ARE CONVENIENT AND EASY TO USE

contain Furacin 0.2% in water-miscible vehicles

EATON LABORATORIES Inc
NORWICH NEW YORK

THE NITROFURANS A UNIQUE CLASS OF ANTIMICROBIALS ... PRODUCTS OF EATON RESEARCH

The first truly elastic bandage the dryer won't "kill"

Even in the autoclave, new TENSOR with Heat-Resistant live rubber threads won't lose its stretch

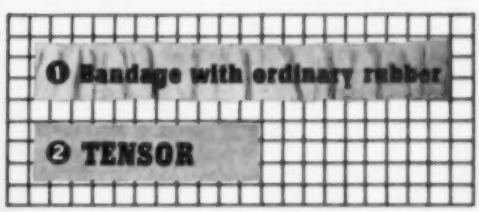
Here's the first truly elastic bandage that doesn't require *special handling* at the laundry to protect its stretch . . . the first elastic bandage that heat won't hurt.

The Heat-Resistant live rubber threads in new Tensor can stand temperatures up to 280° F. with no appreciable loss of elasticity. They are virtually unaffected by the high heat of commercial or hospital drying equipment.

The result: Tensor lasts much longer . . . and costs less to use. Even after many, many launderings, you can still rely on Tensor to provide the steady, easy-to-control pressure that made it famous as the first truly elastic bandage.

Have you ordered new Tensor yet? It's available (at no increase in cost) in hospital bulk put-ups. Why not specify Tensor next time you stock up on medical supplies?

COMPARE THESE ELASTIC BANDAGES



❶ One-foot length of bandage made with ordinary rubber is stretched after high temperature drying—and stays stretched. Its elasticity "died" in the dryer.

❷ But one-foot length of heat-resistant Tensor snaps back to its original length, even after prolonged exposure to near scorching heat of commercial dryer.

New TENSOR® ELASTIC BANDAGE

Woven with Heat-Resistant live rubber threads

BAUER & BLACK

Division of The Kendall Co.
309 West Jackson Blvd., Chicago 6, Ill.

your hay-fever patients will prefer

CO-PYRONIL

(PYRROBUTAMINE COMPOUND, LILLY)

to any other antihistaminic

'Co-Pyronil' affords

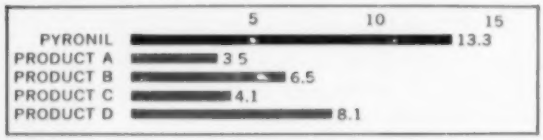
rapid relief
—within fifteen to thirty minutes

complete relief

prolonged relief

with fewer side-effects
—rarely causes sedation, even on high dosage

Maximum Duration of Effect in 50 Percent of Guinea Pigs Subjected to a Histamine Aerosol (Hours)*



DOSE: 1 or 2 pulvules every eight to twelve hours.

NEW
SUSPENSION

CO-PYRONIL

Taste-tested and approved by the Junior Taste Panel. Each teaspoonful of suspension is equivalent to half the formula contained in one Pulvule 'Co-Pyronil.'

*Proc. Soc. Exper. Biol. & Med., 80:458, 1952.

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

INDUSTRIAL MEDICINE AND SURGERY

JULY, 1954

Beryllium Extraction, Reduction, and Alloy Fabrication

AN ENGINEERING STUDY COVERING TEN YEARS' EXPERIENCE

JOSEPH SHILEN, M.D., Director, FRED B. KOPPENHAVER, Senior Industrial Hygiene Engineer, JOHN G. CLELAND, Industrial Hygiene Engineer
LEWIN R. LUTZ, Principal Chemist, VIRGINIA M. VOUGHT, Spectographer
Bureau of Industrial Hygiene, Pennsylvania Department of Health, Harrisburg

A NUMBER of engineering studies have been made from 1943 to 1953 in a beryllium extraction and metallurgical company (which produces approximately 90% of the beryllium alloys in the U.S.) to determine what the health hazards may be in such an extensive operation which includes all of the essential steps required to transform raw crystalline beryl ore to a finished product such as a tool, a machine part, a copper-beryllium stock alloy material, or a chemical compound of beryllium, and the data collected during this decade will be presented here. These engineering studies were made in a plant where the various materials were handled continually through the years and the amount of material handled per day ran into many tons. It may be further stressed that the data presented here do not involve operations where the material is occasionally handled in trifling amounts of several pounds, or perhaps a ton or so as a side-line specialty. These data are for operations where many men have been exposed, often for many years, and where these same men and similar materials may be expected to present this same challenge in the future. The exposures of these men to beryllium, to copper, and to the complex fluorides and silicofluorides have been definite and closely related to the continuous period of years of production which fluctuate only as normal business and economy may have affected production. The results so expressed may therefore be expected to represent concentrations that are relatively high, i.e., the data to be found in extended activity of an industrial establishment operated on large-scale production; but they do not show what the concentrations may be when industrial activity during the said decade was low and of minor magnitude, nor do they intend to show situations where beryllium was handled as a small side-line operation as the case may be in some industries where the main product manufactured has nothing to do with beryllium extraction or metallurgy. It may therefore be fairly presumed that if any pathology should exist or be discovered in the future, then reliable data taken under actual large-scale industrial activity have been presented here, and at least a fair baseline for past data and exposure is now released for further consideration upon which a value for toxicity could be based if the pathology that might develop can be related to occupational disease. Since the over-all data represent a fairly wide range in terms of concentrations, low to relatively high even under normal activity, they also indicate that, for any chemical constituents encountered in this study, the incidence of pathology naturally should be higher where the data indicate the higher exposures if the cause of pathology is inherent either to beryllium, to copper, or to a series of substances as found here and further enumerated. It is just as important to consider the varied changes of chemical form in which the beryllium has been used to become both respirable and contactable, i.e., as the inert raw insoluble ore in a coarse uncrushed state and later in a comminuted raw form without admixture with other ingredients; as the fine crushed ore mixed with soluble and insoluble silicofluorides; as the respirable dusts of hot dry sintered ore in which beryllium becomes a soluble oxyfluoride with its excess of silicofluorides and insoluble cryolites of iron and other adjuncts; as the complex aqueous solution of the sintered ore; as the precipitated hydroxide of beryllium before filtration and after filtration; as the partially wet and pasty hydroxide, the dried hydroxide, and the very fine calcined beryllium oxide to which exposures occur before and while calcining; and as additional exposures in preparation of certain mixtures for the metallurgical reduction process. It should be stressed that, so far, chemically combined beryllium has been the only common denominator and that exposure to copper and copper-beryllium alloys has not yet become a common de-

nominator. Continuing the consideration of exposures to the dusts, smokes, fumes, and vapors inherent in the following complex processes which are carried on in large-scale production, copper in its metallic and oxide forms becomes combined with the beryllium oxide as well as with small amounts of residual fluorides when it is reduced to alloys by melting and remelting several times to form a homogeneous copper-beryllium master alloy. Remelting of the alloy must be repeated to adjust the master alloy to the several specifications as demanded in commercial alloys. Many of these commercial alloys may be remelted in a foundry to be cast into molds or cast directly as a billet and surface-machined for working in hot and cold mill operations in the reduction of the alloys to strip, rod, or wire. With a viewpoint for research into toxicity or non-toxicity of either copper, beryllium, or a copper-beryllium alloy combination, the foregoing statements have established for the reader's consideration that a complexity of chemical forms is involved. This complexity must, in all fairness, be continued into one more major step which involves annealing. It happens that the annealing operations are located in an area adjacent to cold mill operations where there is little possibility of contamination of beryllium or fluorides from other processes. When annealing certain copper-beryllium alloys the annealing temperatures will produce gross surface oxidation of the alloy. This oxidized crusting of the metal will easily chip, crush, and form a heavy free flake scale on alloys of about 0.5% beryllium in copper. In 2% beryllium alloys the outside skin is light and tight but high in beryllium oxide content. In any event, crusting may take place during handling and form an air-borne dust so that an exposure to dusts of the oxidized alloy exists for consideration of the non-toxicity or the degree of toxicity of oxidation products of copper-beryllium alloy, not only in this plant but also wherever the alloy must be heat-treated similarly in manufacturing processes in other plants that may use copper-beryllium alloys. In sharp contrast to the surface oxidation as found in annealing of copper-beryllium alloy is the type of dust, almost entirely metallic and non-oxidized, as produced in the more common machine shop operations which involve the shaping, forming, and finishing of a copper-beryllium alloy in both its cast form and in its rolled or extruded form. Some metallic alloy dust from the copper-beryllium alloy components is produced by grinding, buffing, polishing, drilling, turning, and other miscellaneous machine shop operations generally seen in the routine production of a variety of tools and machine parts; however, in this shop it is a case of utilizing copper-beryllium alloy as the material of construction. This ma-

TABLE I.
RAW BERYL ORE CRUSHER

Operation or Process	Year	Be (mg/m³)	(Dust) (mppcf)	Atmospheric Pollutant
Primary rock crusher*	1953	0.020	3.1	Raw beryl ore
		1.120	3.1	
	1949	0.858		
		0.943		
		0.562		
		0.572		
	1947	1.300	10.8	
		1.300	10.0	
			9.6	
			3.2	

*Manually fed crusher, crushed ore automatically conveyed in enclosed elevator.

TABLE II.
OXIDE DEPARTMENT

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Atmospheric Pollutant
Wet ore mixer charging*	1953	0.0080	0.340	Raw beryl ore with cross-contamination potential from sintering and mixing
	1950	0.2230		
		0.1060		
	1949	0.8590	0.220	
		0.7170	0.220	
	1943		1.790	
			4.470	
*Both input and output ends of mill open to atmosphere, charging and discharging is essentially mechanical.				
Batch mixer* (Lancaster mixer)	1953	0.0070	0.943	Raw comminuted beryl ore, iron cryolite, sodium silicofluoride and sodium carbonate
		0.0150	1.684	
	1949	0.1940	1.240	
	1947	0.0140	1.800	
		0.0000	2.830	
	1943		3.333	
			0.974	
*Manual loading from floor to mixer, mixer exhaust ventilated, enclosed mechanical "drop" discharge of mix to table for making briquettes.				
Leaching tank*	1953	0.1100	0.340	Comminuted sintered material from crusher and miller mixed with water
*Tank open, charged by pump, discharged through pipe, general ventilation.				
Filter presses*	1953	0.0290	0.269	Precipitated beryllium hydroxide with small amounts of silicofluorides and alkali precipitating solution, cryolites
		0.0200	0.404	
*Filter cakes manually removed into open boxes, general ventilation.				
Calcining furnace*	1953	15.2700	0.943	Both beryllium hydroxide from filter press and the calcined beryllium oxide in powdery dry form
		0.4490	0.684	
	1953	0.0053	0.990	
	4 mo. later	0.0018	0.720	
*Broken filter cakes manually shoveled on conveyor, furnace exhaust ventilated, discharge into drums, exhaust ventilated, operator wears respirator.				
Recovery area, dross treatment*	1953	0.0014	0.960	Dross from arc and induction furnaces containing metallic fluorides and the metals of copper, beryllium, aluminum, magnesium, with carbides of beryllium intermixed with the dross itself
		0.0018	0.960	
*Mixers are open, charged manually, discharge flow semi-automatic.				

chine shop dust represents a copper-beryllium alloy dust in its mechanically comminuted form in both respirable and non-respirable sizes with little or no possibility of a chemical change to the minute particles, excepting several minor grinding operations performed at grinding speeds capable of heating the finer particles to oxidizing temperatures.

No data for beryllium or fluorides will be presented for the pickling and plating departments because it was considered doubtful if the results so obtained would be solely representative of the operation itself, owing to general cross-contamination from other areas. It certainly is more important to evaluate the health hazards due to oxides of nitrogen from pickling and bright dipping, which have an established notoriety as a health hazard, rather than to express the data in terms of beryllium of unestablished toxicity or to consider the values of fluorides as found here entirely as a factor of cross-contamination.

A series of tables has been arranged for further study of the problems concerning an assumed beryllium toxicity. To assume beryllium as toxic from the beginning was regarded as the most prudent policy to follow until its real status on the toxicological scale has been proved by scientific studies of environmental conditions of exposure and by medical examination and evaluation of case histories which become available for those that have been exposed.

Tables I to VII inclusive show a compilation of results of concentrations for air-borne beryllium, fluorides, and silicofluorides as found from 1943 to 1953. A careful study of these tables will show that air-borne fluorides and silicofluorides are usually present in measurable amounts and, in a number of instances, the concentrations have even exceeded the generally stated maximum allowable concentration of 2.5 milligrams per cubic meter of air. Owing to the presence of mixed fluorides in amounts relatively larger than the beryllium, it has always been considered as the most likely substance to present a health hazard in the processes of extraction and metallurgical reduction.

TABLE II. (continued)
OXIDE DEPARTMENT

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Atmospheric Pollutant
Briquetting, manual*	1953	0.0070	1.684	Same as for batch mixing with cross-contamination from sintering
		0.0100	1.078	
	1947	0.0000	1.510	
		0.0000	1.170	
	1943		0.000	
			0.084	
*Direct manual handling and manual forming of briquette, stacking of same, general ventilation only.				
Sinter furnace*	1953	0.0080	1.482	Both green and fired briquette containing the soluble fluoride of beryllium plus other soluble fluoride complexes formed adjuncts in the natural ore
		0.0100	1.752	
		0.0170	1.213	
		0.0120	0.808	
	1950	0.2690		
		0.1520		
		0.0570		
		0.0000		
	1949	0.2370	2.120	
		0.6460	3.850	
		0.2530	8.610	
	1947	0.5820	5.900	
		0.6170	9.600	
	1943		0.407	
			0.407	
			2.110	
			0.488	
			0.325	
			0.751	
			0.687	
*Manual loading of flat bottom cars with briquettes and manual displacement of fired briquettes from cars to floor, only the furnace is enclosed and exhaust ventilated, operator wears respirator.				
Sinter crusher, feeder end*	1953	0.0460	2.021	Soluble beryllium silicofluoride and other soluble and insoluble complexes as yet dry and generally hot
		0.0600	7.209	
		0.0100	0.943 (vibrator area)	
		0.0300	0.943 (vibrator area)	
	1950	0.3780		
		0.3750		
	1949		7.210	
			6.150	
			1.600	
			1.460	
	1947	0.7060	2.000	
		0.6530	10.600	
*Direct manual feeding of crusher hopper, crushed sintered briquettes conveyed by enclosed elevator and vibrator to wet mill, general ventilation only, operator wears respirator.				

Some consideration has been attached to the acidic nature of beryllium salts when chemically combined as a fluoride; however, while such a situation in a chemically pure salt is conceded, it must be remembered that in the exposures here evaluated there exists a fairly constant condition where the air-borne dusts contain an admixture which is maintained basic. After the beryllium has been extracted to become an oxide it no longer is associated as a fluoride but as an alloy with copper in the remainder of the metallurgical process where it will not exhibit the acidic or basic properties of a salt but transforms itself to a metallic role as an alloy or an oxidized alloy. The fluorides that are found in some sections of the metallurgical process are due partly to common cross-contamination, and partly to the volatilization of entrained fluoride compounds in the intense heat required to melt copper-beryllium alloy.

From time to time the question of a potential health hazard due to transformation of the silicofluorides to silicon tetrafluoride in the sintering of the silicates of the beryl ore has been raised. By actual chemical tests on samples of air from within the sintering furnaces we have found that formation of free silicon tetrafluoride occurs only in trace amounts—to 0.01 parts per million—in the hot furnace atmos-

phere itself, while in the breathing zone there is none. The same question concerning the fate of the silicofluorides in the sintering has been extended to the assumption by some investigators that formation of the highly corrosive hydrogen fluoride may occur under the influence of sintering temperatures upon the raw briquette mix. Since hydrofluoric acid is highly corrosive to common constructional materials such as cement and glass, a careful examination was made upon such materials that were known to have been exposed for a long time, but no evidence of corrosion attributable to hydrofluoric or the hydrolizable hydrosilicofluoric acids could be found. A series of tests made for free hydrofluoric and hydrosilicofluoric acids in the furnace atmosphere and in the respirable atmosphere throughout the entire working area showed definitely that neither of these substances was present in its free form. These tests further corroborated the fact that no corrosion was caused by these acids. The accidental release of these two materials is almost impossible because of the basic mix which is maintained throughout the extraction process.

Another series of tests not shown in the tables was made upon radioactive adjuncts of the beryl ore. A consideration of the beryl ore itself, its associated minerals, and its varied sources from different areas of the globe, prompted such a study. A careful preliminary check of the ore itself showed that some shipments contained insignificant quantities of radioactive minerals readily identifiable to a mineralogist. However, the minute amounts and their sporadic occurrence seemed to indicate that even a trifing exposure to radioactive air-borne dusts was remote. Nevertheless, checks with a Geiger-Muller instrument have been made in the plant to determine if an accumulation of long-life radioactive mineral substances may have become a hazard. Quantities of dusts which had collected for an indefinite time and from many different shipments of ore were also tested by a film printing technique, but the only positive results were on hand-picked specimens found on the outside near the primary crusher; all in-plant specimens were proved to exhibit no radioactivity. Such tests failed to show sufficient evidence for even an assumption that the respirable atmosphere has been altered in its radioactivity.

Tables I to VII inclusive are for study of the environmental or occupational exposure to airborne or respirable matter containing raw beryllium ore; to fluorides, mainly in the form of silicofluorides combined with sodium, iron, and beryllium; to metallic oxyfluorides and carbonates, mainly from commercial soda ash used in fusion reactions; to hydroxide of beryllium and the oxide of beryllium as formed by heat transformation of the hydroxide; to oxides of beryllium as formed by surface oxidation of its metallic alloys; to metallic fumes of copper-beryllium alloys; to the dross dusts and fumes produced by electric arc furnaces in melting such alloys, together with the fumes of special metallurgical reduction processes such as the fumes in the production of beryllium metal and beryllium-aluminum alloys; and to fumes and dusts from hot milling, cold milling, and machine shop operations upon copper-beryllium alloys. Also included are the oxides of nitrogen produced in pickling and bright dipping of copper-beryllium alloy.

The atmospheric samples for both fluorides and beryllium were taken in large all-glass impingers at a rate of 1 cubic foot of air per minute. The data presented for 1950 and 1953 represent samples containing 30 or more cubic feet of air while

TABLE III.
ARC FURNACE DEPARTMENT

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Atmospheric Pollutant
Arc furnaces* Master alloy production	1953	0.119	0.135	Hot metallic fumes of copper and beryllium with residual fluorides
		0.324	0.808	
		0.058	0.269	
		0.194	0.684	
	1950	0.000		
		0.000		
	1949		0.510	
			0.510	
	1943		0.568	
			0.261	
Be charge mixing	1949		2.020	Cross contamination from arc furnace fumes and dust from copper oxide, beryllium oxide
	1943		0.084	
			0.534	
Booth* Copper-beryllium dross removal	1949**		24.400	Hot copper-beryllium alloy fumes and hot dross
			6.480	
	1947**		2.010	
			0.730	
			0.510	
			0.880	

*Electric arc furnaces, upright type, charged at top, conventional breast tapping, top of furnace and breast exhaust ventilated.

*Conventional skimming of dross in "walk-in" type exhaust ventilated booth. **Essentially the same operation in 1953.

TABLE IV.
DETROIT FURNACE DEPARTMENT

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Atmospheric Pollution
Detroit furnaces*	1953	0.029	0.0340	Hot copper-beryllium alloy fumes with hot fluoride fumes
		0.106	0.0510	
		0.245	0.0330	
		0.088	0.0670	
	1949		1.1500	
			5.4600	
			0.4200	
			0.3600	
			1.9700	
			1.4600	
			0.9500	
			0.7300	
			1.0900	
	1947		2.0100	
			0.7300	
			0.5100	
			0.8800	
	1943		0.0831	
			0.5700	
			0.0400	
			0.5680	
			0.2610	
			0.2430	
			0.0620	
			0.0620	

*Electric arc furnaces of rocking type, manual charging and conventional tapping into ladles and casting, general ventilation through exhaust fans installed in roof monitor.

TABLE V.
FOUNDRY DEPARTMENT

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Dust (mppcf)	Atmospheric Pollutant
Melting and casting section*	1953	0.019 0.035	0.000 0.000	2.4 2.3 2.6 3.2	Hot metallic fumes from copper-beryllium alloys, bronze and brass, with unpredictable cross-contamination from Ajax furnace operation
	1949		0.870 0.360 0.360		
	1947	0.044 0.046	0.320 0.170	0.2 0.3 0.1 0.4	
	1943		0.138 0.241 0.309 0.504 0.122 0.141 0.062 0.062 0.069	2.0 7.0 4.1 2.2	
Ajax furnace*	1953	0.011 0.060 0.184 0.067	4.407 0.601 2.244 10.634		Hot fumes and sublimates of beryllium, magnesium, and aluminum fluorides
	1949		0.870 0.580		
	1947	8.840 6.070 2.010 2.850			
Abrasive grinding and cleaning section*	1953	0.015 0.007			Copper-beryllium alloy dusts in metallic form
Hot mill section Rotary furnace*	1953	0.029 0.006	0.033 0.0?3		Copper-beryllium dust from surface oxidation and unpredictable cross-contamination from Ajax furnace area
	1943		0.062		
Scarfing section*	1953	0.010 0.005	0.000 0.000		Course and fine metallic chips from copper-beryllium alloy

*Some furnace melting pots used mostly for brass under canopy hood, others on main floor only, conventional procedures common for non-ferrous founding.

*Induction electric furnace partially isolated, furnace strongly exhaust ventilated, conventional charging of mix, and drawing and skimming of products, operator wears respirator, shield.

*Exhaust ventilated equipment of a common commercial manufacture and design.

*Conventional soaking and manipulation of billets through a hot mill to produce strips, general ventilation only.

*Scarfing machine, general ventilation.

samples in 1947 and prior generally represent concentrations of 20 cubic feet of air. These samples cover a sufficiently long period of time to integrate the maximum and minimum fluctuations in concentrations into a reliable constant. The sampling positions were always chosen as close to the actual working position as was physically possible in order to allow the normal activity to proceed, as well as to collect a representative sample for the position at the same time. Appropriate samples were taken at several related positions to evaluate the existence of the combined concentrations from all of the operations which could be considered as contributors to general atmospheric pollution in the particular area or building concerned. Each table has been fully clarified with explanatory notes that have a bearing on the process and pollution material to which any person is exposed while working in that immediate environment. Particular attention is called to the units used in the tables to express air-borne beryllium concentrations. The beryllium is expressed in milligrams per cubic meter of air, there being no need in this study to take recourse to the much smaller microgram or "gamma" unit as found frequently in the literature on this subject. The units used for both beryllium and fluorides are the same and therefore readily put each substance into the same perspective for comparison.

Table VII shows the concentrations of oxides of nitrogen and cadmium. It has been introduced to demonstrate that, when certain obscure symptoms probably related to pulmonary pathology have been noted in an individual, then it should immediately be ascertained to what extent oxides of nitrogen are found under normal operating conditions and also the potentiality for excessive exposures under adverse operating conditions. This table will show how beryllium and copper may be a common denominator associated with such unquestionably hazardous substances as nitric acid, sulfuric acid, cadmium salts and metal, certain cyanides, and the fumes prevalent to their use and interaction.

It has been shown in Tables I to VI inclusive that beryllium becomes air-borne and therefore presumably is respirable. In order to prove this important point, several employees who had worked for a number of years with beryllium exposures submitted urine for analysis. Table VIII shows the quantity of beryllium in micrograms per liter of urine. A review of the results as shown in Table VIII leaves nothing to presume in regard to exposure to beryllium in various departments at the plant. It shows that, without exception, beryllium has been taken into the body and subjected to physiological processes ultimately to be excreted, at least partly, in the urine. It also demonstrates that, if beryllium were a highly toxic substance, then these individuals should manifest, to some degree, the symptoms attributable to beryllium.

Analytical Methods Used in the Study

THE ATMOSPHERIC dusts were collected with the Greenburg-Smith impinger using (1) distilled water, or (2) 2% sodium carbonate. The distilled water was used for the collection of beryllium dust and the alkali solution for the fluoride dust.

Having had unsatisfactory results both with

the curcumin (colorimetric method) and the quinizarin 2-sulfonic acid (fluorescence method), the p-nitrobenzeneazoorcinol (called zenia) in 0.1N sodium hydroxide solution (spectrophotometric method) proved very satisfactory. This zenia dye solution, when added to a moderately alkaline solution containing beryllium, forms a red-brown lake. The absorption of light by this colored complex does not strictly follow Beer's law, but by careful control and duplication of conditions, such as optimum alkalinity, amount of foreign ions, dye strength, and temperature the relationship of light absorption to beryllium content can be accurately fixed.

The departmental air-borne fluoride samples, collected as previously mentioned, were analyzed by a modification of the method of Willard and Winter, titrating with thorium nitrate, and the results were expressed as sodium fluoride.

The urine specimens, in which beryllium and fluorides were present as sodium fluorides, were collected in sterilized gallon glass containers over a 24-hour period. The collecting period was started on Saturday evening and ended the following Sunday evening. The glass containers were brought to the laboratory the following morning and the analyses were begun. The specimens were collected over the week-end so that the employees would be away from the plant and therefore the samples would not become contaminated. The beryllium and sodium fluorides were determined on aliquot samples. After the organic material was destroyed the beryllium element was determined with the spectrograph, while the sodium fluorides were determined with the Willard and Winter method, titrating with thorium nitrate, and the results were expressed as sodium fluoride.

TABLE VI.
COLD MILL BUILDING AND MACHINE SHOP

Operation or Process	Year	Be (mg/m³)	Fl (mg/m³)	Atmospheric Pollutant
Cold mill section*				
Strip drawing	1953	0.004	0.000	Cold copper-beryllium alloy dusts
		0.002	0.000	
		0.004	0.000	
		0.008	0.000	
	1950	0.318		
		0.180		
Annealing ovens	1953	0.035		Dusts of surface oxidation of copper-beryllium alloys
		0.014		
		0.022		
		0.011		
Machine shop section*				
Lathe	1953	0.005	0.000	Dust essentially of unaltered copper-beryllium alloys
		0.007	0.000	
Grinders	1953	0.015**		
		0.007**		
	1950	1.130		
		0.318		

*All equipment as commonly used in drawing, slitting, heat-treatment and annealing of materials, general ventilation.

*All machinery as commonly found in machine shops, lathe not ventilated, grinders exhaust ventilated.

**Located in copper-beryllium foundry.

TABLE VII.
PLATING AND PICKLING AREA
OXIDES OF NITROGEN AND CADMIUM

Location	Year	No. of Samples	Oxides of Nitrogen (ppm) Max.	Min.	Ave.
Pickling and plating					
New pickling room*	1953	17	110	0	10
	1950	12	25	0	13
	1949	20	9	0	2
Old pickling room and adjacent plating room	1947	16	145	13	56
Old pickling room	1943	3	157	11	102

*Nitric acid tanks provided with canopy-type exhaust ventilation, with provision to operate hoists and cranes freely under hoods and egress of crane to outside.

Location	Year	No. of Samples	Cadmium (mg/m³) Max.	Min.	Ave.
Plating and buffing*	1953	4	0.095	0.081	0.090
	1950	2	0.163	0.159	0.161
	1949	4	18.360	0.440	5.750

*Long series of tanks containing bright dipping, washing, plating, and rewashing tanks followed by continuous buffing of copper-beryllium alloy strip.

TABLE VIII.
URINARY EXCRETION OF BERYLLIUM

Environmental Department	Job Classification	Years of Company Service	Beryllium (micrograms per liter of urine)
Oxide department	Ball mill operator	16	2.450
	Crew leader and leach operator	13	2.220
	Assistant leach operator	2	5.430
	Cryolite operator	15	1.500
Electric arc furnace department	Furnace operator	7	4.520
	Furnace operator	9	4.960
Detroit electric arc furnace department	Crew leader for furnace operation	14	1.480
Ajax electric induction furnace department	Furnace operator	10	4.440 4.120
Foundry	Melter	12	2.980
	Scarfer	12	0.890
Cold mill	Bulk annealer	3	0.420
	Cold roller	13	0.380
	Cold roller	12	0.114
Machine shop	Crew leader, machines	12	0.106
Mill stock room	Stock clerk	10	0.210
	Stock clerk	3	0.320
Inspection	Inspector	5	0.090
Engineering	Draftsman	6	0.410
	Safety engineer	6	1.060
Welding	Main welder	3	0.960
Rod and wire	Die maker	11	0.080

TABLE IX.
ABNORMALITIES FOUND BY CHEST X-RAY EXAMINATION

	1947	1950	1951	1952	1953
Total x-rayed	291	277	349	395	424
X-rayed (%)	94	100	100	100	100
Normal	277	270	342	386	414
Abnormal	15	7	7	9	10
Plural adhesion	1	3	3	3	3
Increased density	9	2	2	3	4
Increased density with possible foreign particle inhalation	5	1	1	2	2
Suspected T.B.		1			
Healed T.B.			1	1	1

Medical Findings

MEDICAL data for the study are shown principally in tabular arrangement, it being felt that a close perusal of the information so presented needs little supplementary explanation.

In 1947, again in 1950, and yearly thereafter the chests of employees working at this plant were x-rayed by the Bureau's 70 mm. x-ray unit. These negatives were examined and evaluated in the Harrisburg office of this Bureau. As can be seen in the following tables, the first survey in 1947 obtained the cooperation of 291 out of 310 employees, or 94%. Since that time, however, the four succeeding surveys have attracted a participation of 100% of the employees in each case. There were 15 abnormalities in the x-rays taken in 1947, seven in 1950, seven in 1951, nine in 1952, and 10 in 1953 (Table IX).

A large percentage of those found having abnormalities in 1947 are still employed by the company. This is essentially true throughout the entire time. Also Table X shows that a large percentage of the abnormalities found in 1950 were present each succeeding year and those having them appear to be still working normally.

From Table XI it can be observed that the average length of service for the men in this plant compares very favorably with other metal in-

TABLE X.
DETAIL OF FINDINGS OF MASS CHEST X-RAY SURVEYS

(1) Employment classification and record	(2) 1947 (8/26/47)	(3) 1950 (1/9/50)	(4) 1951 (1/11/51)	(5) 1952 (1/29/52)	(6) 1953 (5/25/53)	(7) Medical records
Wet mill operator Employed 1941-49 Prior to 1941—puddler's helper—30 yrs. Age 1947—66 yrs.	Increased density both bases, enlarged heart shadow					11/47—Cardiac disease 1948—Healthy chest 1949—Healthy chest
Core maker Employed 1940-48 Prior to 1940—core maker—3 yrs. Age 1947—41 yrs.	Increased density both lung fields					1947—Healthy chest 1948—Healthy chest
Scarfer and tool assembler Employed 1942-49 Prior to 1942—mill, 2 yrs. Age 1947—63 yrs.	Increased density both lung fields, flattened heart shadow					1948—Cardiac disease
Purchasing agent Employed 1942-48 Prior to 1942—hosiery industry—21 yrs. Age 1947—45 yrs.	Increased density both lung bases					1948—Died, cirrhosis of liver
Furnace helper Employed 1942-50 Prior to 1942—pipe molder—16 yrs. Age 1947—53 yrs.	Increased density both lung bases			right sub clavicle area, probably foreign particle inhalation, no change from 1946		1946—Pulmonary parenchyma 1948—Increased density
Roller helper and engineer Employed 1939-49 Prior to 1939—silk weaver—17 yrs. Age 1947—45 yrs.	Increased density both lung bases					9/47—Healthy lung fields 9/49—Pneumonitis (clearing in one week) 1949—Died, coronary occlusion, coronary sclerosis, confirmed by autopsy
Furnace helper Employed 1940-49 Prior to 1940—furnace helper Age 1947—25 yrs.	Increased density both lung fields					1946—Decreased ventilation, both lung fields, possible foreign particles 6/47—Same 1948—Same, weight 195, vital capacity 94%, re-enlisted in armed forces
Melter and Ajax furnace operator Employed 1941-48 Prior to 1941—hosiery worker—11 yrs. Age 1947—46 yrs.	Slight increased density, right base					Employed elsewhere, still working
Molder Employed 1943-present Prior to 1943—molder's helper—2 yrs. Age 1947—46 yrs.	Increased density both lung fields					1948—Weight 158, vital capacity 76%, no evidence of foreign particle inhalation 1949—Healthy chest 1953—Weight 170, vital capacity 91%
Watchman Employed 1939-present Prior to 1939—salesman—22 yrs. weaver—8 yrs. Age 1947—61 yrs.				Increased density both lung fields, no definite pathology	Same	1942—Hypertension 12/48—Cardiac condition, weight 209, vital capacity 78% 1953—Weight 193, vital capacity 73%

TABLE X. (continued)
DETAIL OF FINDINGS OF MASS CHEST X-RAY SURVEYS

(1) Employment classification and record	(2) 1947 (8/26/47)	(3) 1950 (1/9/50)	(4) 1952 (1/11/51)	(5) 1953 (1/29/52)	(6) 1953 (5/25/53)	(7) Medical records
Watchman Employed 1943-present Prior to 1943—highway worker—8 yrs. carpenter—1 yr. handyman—2 yrs. Age 1947—56 yrs.	Increased density both lung bases	(Cardiac enlargement not tabulated after 1947)				1948—Weight 195, vital capacity 100%, heart slightly enlarged 1950—Hilar shadows on x-ray, no pneumonitis, enlarged heart
Ore mill operator Employed 1936-present Prior to 1936—foundry molder—22 yrs. Age 1947—48 yrs.	Slight increased density both lung fields	Same	Same	Same	Same	1948—Weight 196, vital capacity 62%, increased density may be pneumoconiosis, findings consistent with foreign particle inhalation 1953—Weight 215, vital capacity, 67%
General laborer Employed 1942-present Prior to 1942—farm labor Age 1947—33 yrs.	Increased density both lung fields, no definite pathology	Same	Same	Same	Same	1948—Weight 247, vital capacity 95%, increased density in lung bases may be due to inhalation of foreign particles 1950-51—X-ray does not resemble granulomatosis 1953—Weight 173, vital capacity 91%
Furnace operator Employed 1942-present Prior to 1942—paint plant—6 yrs. Age 1947—31 yrs.	Increased density both lung bases					1942—Weight 167½ 12/47—Tracheal bronchitis, increased density in hilar, nothing peculiar to beryllium exposure 4/48—Same 1953—Weight 185, vital capacity 88%
Furnace operator Employed 1947-present Prior to 1947—none Age 1947—25 yrs.	Increased density both lung fields, enlarged cardiac shadow					1940—Weight 147 1947—Enlarged cardiac shadow 1948—Weight 171, vital capacity 100%, moderate increase of hilar shadow, no pulmonary infection 1953—Weight 169, vital capacity 99%
Furnace helper, pickler Employed 1945-present Prior to 1945—none Age 1947—30 yrs.	Plural adhesion	Same	Same	Same	Same	1948—Weight 167, vital capacity 90%, healthy chest, reported to have pleurisy prior to employment 1953—Weight 149, vital capacity 99%
Cold mill operator Employed 1943-present Prior to 1943—textiles—6 yrs. Age 1947—27 yrs.		Suspected tuberculosis	Known healed tuberculosis	Same	Same	1939—Tuberculosis 1943—Weight 144 1948—Weight 166, vital capacity 95% 1953—Weight 187, vital capacity 96%
Hot mill and cold mill operator Employed 1945-present Prior to 1945—general labor—5 yrs. Age 1947—24 yrs.		Plural adhesion	Same	Same	Same	1945—Healthy chest 1948—Weight 166, vital capacity 80%, x-ray shows no change since 1945
Plater Employed 1942-present Prior to 1942—steel mill—5 yrs. railroad shops—9 yrs. self-employed—22 yrs. Age 1947—60 yrs.		Calcified nodules at left root	Same	Same	Same	1942—Heart impaired 1946—Weight 160, enlarged cardiac shadow 3/18/48—Vital capacity 83% 1948—Calcified glands in left hilium, rest of picture clear

TABLE X. (continued)
DETAIL OF FINDINGS OF MASS CHEST X-RAY SURVEYS

(1) Employment classification and record	(2) 1947 (8/26/47)	(3) 1950 (1/9/50)	(4) 1952 (1/11/51)	(5) 1953 (1/29/52)	(9) 1953 (5/25/53)	(7) Medical records
Laborer Employed 1939-present Prior to 1939—shipping—3 yrs. Age 1947—38 yrs.		Plural adhesion	Same	Same	Same	1948—No x-ray findings 1949—Healthy chest 1951—Healthy chest 1953—Weight 146, vital capacity 68%
Core maker, box maker Employed 1943-present Prior to 1943—core maker—16 yrs. Age 1947—57 yrs.				Increased density both lung fields	Same	1943—Weight 173 1948—X-ray pulmonary changes suspected but not definite, vital capacity 82% 1950—X-ray pulmonary changes may be due to occupation 1951—X-rays (3) show no changes 1953—Weight 182, vital capacity 73%
Arc furnace operator Employed 1948-present Prior to 1948—Navy—5 yrs. furniture store—2 yrs. Age 1948—23 yrs.					Increased density both lung fields	1948—Healthy chest 1950—No evidence of infection from pneumonitis 1951—No evidence of pneumonitis from present employment 12/53—Increased density throughout chest could be from pneumonitis as consequence of beryllium particle inhalation

TABLE XI.
LENGTHS OF SERVICE, WEIGHT CHANGES, AND VITAL CAPACITIES

Department	Employment range	Average length of service	Average increase or decrease in weight since employed (pounds)	Average vital capacity (%)
Machine shop	1 yr.-12 yr.	7 yr. 7 mo.	plus 7	89.4
Production	8 mo.- 8 yr.	4 yr. 1 mo.	plus 5	101.5
Metallurgical laboratory	4 mo.-11 yr.	6 yr. 3 mo.	plus 3	97.2
Analytical laboratory	1 yr.-11 yr.	5 yr. 4 mo.	plus 5	99.2
Engineering	1 yr.-11 yr.	5 yr. 6 mo.	plus 11	101.0
Research laboratory	2 mo.-11 yr.	3 yr. 2 mo.	plus 2	99.6
Hot mill	1 mo.-14 yr.	4 yr. 6 mo.	plus 2	98.1
Plant protection	1 yr.-11 yr.	8 yr. 5 mo.	minus 6	88.7
Rod and wire	3 mo.-12 yr.	7 yr. 8 mo.	minus 2	102.1
Detroit furnace	3 mo.-13 yr.	5 yr. 7 mo.	plus 9	104.1
Inspection	3 mo.-11 yr.	4 yr. 7 mo.	plus 11	97.3
Oxide	2 mo.-18 yr.	6 yr. 3 mo.	plus 4	91.6
Shipping	3 yr.-11 yr.	8 yr. 1 mo.	plus 8	96.2
Foundry	1 mo.-13 yr.	5 yr. 6 mo.	plus 8	99.4
Pickling and plating	2 mo.-13 yr.	7 yr. 4 mo.	plus 7	97.1
Maintenance	1 mo.-18 yr.	6 yr. 5 mo.	plus 7	100.8
Stores	6 yr.-10 yr.	7 yr. 8 mo.	plus 7	98.0
Scrap reclamation	3 yr.-12 yr.	8 yr. 6 mo.	plus 10	85.2
Beryllium aluminum	3 yr.-10 yr.	6 yr. 6 mo.	plus 11	97.5
Master alloy	3 mo.-13 yr.	6 yr. 3 mo.	plus 7	96.9
Mill, general	3 mo.-12 yr.	5 yr. 6 mo.	plus 17	96.0
Cold mill	4 mo.-13 yr.	7 yr. 2 mo.	plus 6	99.1
Sales	2 mo.-17 yr.	4 yr. 5 mo.	plus 6	101.7
All departments	1 mo.-18 yr.	6 yr. 0 mo.	plus 6	98.5

TABLE XII.
ABSENTEEISM DUE TO ILLNESS

Year	Average days absent per employee (illness)
1951	3.95
1952	4.19
1953	3.89

dustries. The vital capacities of the employees have remained within the normal range and a large majority of them have showed an increase in weight during their employment. Table XII shows that absenteeism in this company is very low and is below the average for the metal industry.

Summary

IT SHOULD be pointed out that this plant is much like any other plant in the metal industry. It has its routine absenteeism and its individual problems, but there is nothing indicated in the entire study to lead to the conclusion that this plant presents more hazardous working conditions than any other plant in the metal industry. The usual hazards of exposure to pickling, dust, grinding, and the like are present as they are in other plants but there is nothing to indicate that special types of control are necessary. Cuts healed cleanly with no granulomatosis. It is believed that the processing of beryllium can be done with the same degree of protection as that used in processing any other metal. While it is true that in some instances, particularly the most recent cases, beryllium poisoning has been suspected, this condition, as of January 1, 1954, has not been conclusively demonstrated.

For the past three years beryllium poisoning has been a compensable occupational disease in Pennsylvania, but no claims for such compensation have been filed against this company as of this same date.

Responsibility of the Professions in the Health Education of the Employee

VIEWPOINT OF THE INDUSTRIAL HYGIENIST

CLYDE M. BERRY, Ph.D., Industrial Hygienist
Esso Standard Oil Company
New York City

WHILE it is true that industrial hygiene personnel are employed by industry, government, insurance agencies, educational institutions and possibly others, the ultimate consumers or beneficiaries are management and labor.

Progressive managements have learned that good industrial hygiene services, properly integrated with medical, safety and engineering activities can contribute materially toward the following desirable goals:

1. Reduction of compensation costs;
2. Reduction of insurance rates;
3. Reduction of rehabilitation expense;
4. Decrease in labor turnover;
5. Increased employee efficiency and morale;
6. Decreased sickness absenteeism costs;
7. Reduction of spoilage, and sometimes
8. Operational savings through engineering improvements.

Many managements were slow to recognize the potential benefits of industrial hygiene services. Their acceptance of these services today is obvious from the fact that adequate numbers of trained personnel are no longer available to meet the demands of industry. Indeed, industry has begun to train personnel for this work.

To achieve more adequately the desired goals, industrial hygienists must now direct their attention to the education of labor concerning the value of their services. They must convince labor that they are not "tools" of a cost-conscious management but rather professional workers with a sincere interest in the worker's health and welfare. What have we as industrial hygienists done to achieve this goal?

Let us look first at how well the worker has accepted industrial hygiene. He has gone a good part of the way when we find that health and safety clauses are being written into labor contracts. We know that he is interested in his health, but then we begin to find anomalies which belie this promising advance. For example, a courageous management may early recognize a potential hazard, provide adequate worker protection, and then be rewarded by demands for extra-hazard pay.

Presented at a Joint Session of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION and the INDUSTRIAL MEDICAL ASSOCIATION, Hotel Sherman, Chicago, April 28, 1954.

The worker has not really accepted industrial hygiene if he believes that industrial hygiene is purely a tool of management. We have not progressed far if our attempts to evaluate a workroom environment are made impossible by faked working conditions and procedures.

What then is our current problem? Our problem is to find ways and means of discharging our professional responsibility to the worker in the field of industrial health education so that we can gain the understanding and support of the prime beneficiary of our efforts—the worker. We cannot deny the responsibility that is ours. It is a problem of worker education.

The Why of Worker Education

THE worker is entitled to know the hazards of his employment on moral and ethical grounds alone. This is merely an application of the golden rule—to do unto others as you would have them do unto you. I am sure that each of us would definitely want to know of any risks involved in his job and what positive measures are being taken to minimize these risks.

Most compensation laws require that the worker be informed of the health and safety potentials of his job. In adjudication there is sometimes a penalty if worker injury occurs and it can be shown that the employee has not been told of the possibilities associated with deviation from an established safe work procedure.

Job training involves telling a worker what to do, where, and how. Modern thinking is that he should also know the why. If a worker is to do a good job, he should know all about it. If he needs to know how his job relates to the productive organization as a whole, he should also know that he has a responsibility to protect himself and his fellow worker. This type of information should be provided in job training.

The worker can use controls provided for his protection in an intelligent way, only if he knows their purpose, their method of functioning, signs of malfunction, and his responsibility in their use and maintenance. The worker can suggest improvements in his working environment only if he knows the reason therefor. Basically, he is personally interested in making his workplace a better and safer place to spend eight hours a

day. He knows more about certain details of his job than anyone else. If a man is intelligent enough to operate an intricate machine, he is intelligent enough to help devise improvements in his working environment.

In the past there has been considerable reticence about telling the worker of the nature of a hazard, its extent, what is being done to control it, and what he should do to assist in its control. The reason for such reticence apparently has been the fear that this information would be disturbing to the worker: he might be frightened and quit or ask for a transfer, or ask for more pay; his fears might result in a higher accident rate; emphasizing health aspects might result in psychosomatic complaints which would be more severe than the health potentials of the job itself.

While there may be an occasional exception, the average American worker is not a neurotic nor a hypochondriac inclined unduly to imaginary ills. Our experience suggests that the American worker has a great deal of aplomb and his emotional stability has often been greatly underestimated when a frank handling of health potentials is being contemplated. The automobile has produced more fatalities in this country than any war and yet each of us drives an automobile. Fires cause tremendous property damage and loss of life every year, yet nearly everyone of us has in his pocket either matches or a lighter. If we are not frightened by a problem, we can discuss it frankly with the worker and he will not be frightened. A known problem properly handled is no problem at all. We know this; he knows this.

Educational Principles

MOST of us will concede that we have not fully discharged our professional responsibility in the health education of the employee. If we have failed to get our message across to the worker, then what have we done incorrectly? What have we done inadequately? What has been untimely? What should we do? And how should we go about it?

In order to get a message across to anyone, we first of all need to get his *attention*. To get attention we need to provide a *stimulus*. One of the things that attracts attention is *change*. We notice a change in the weather, a different squeak in the car, or an increase in the family food costs. A different attitude on our part, an overt attempt to develop a better rapport with the worker, would represent a difference in approach which the worker would immediately recognize. A changed attitude on our part would certainly be attention getting.

In order to get attention there must be an adequate *intensity of stimulus*. There are many, many things that compete for the attention of the audience we are trying to capture. Have you ever considered how lacking in eye appeal are most bulletin boards? Small wonder that many workers do not read them. When first erected they may be advantageously placed and may be very attractive. Very soon they become cluttered with dog-eared material, layer on layer. Most of it is of absolutely no interest to the average workman. Practically all of it has to be read with a magnifying glass. Movies are said to be geared to the intelligence of an average 12 year old. The average poster is geared to an intelligence considerably below this. How many of you think that the average boy would look up from his comic book at the posters you see in a plant?

To get attention we must be *repetitive*. If at first you don't succeed, try, try again. A dripping faucet will eventually be noticed and repaired. If you want to get your ideas across, then keep at it. The advertising business emphasizes repetition. The same ad appears in newspapers time after time. A sponsored radio or TV program will usually be for a season or a series, seldom for a single performance. In the same way, for our purposes, we should lose no opportunity to make another presentation, and another, and another, and another, even though it might be to essentially the same group.

Sometimes it is possible to secure attention that we desire by being *novel* in the presentation. The extreme of this, of course, is the shock treatment, an example of which is the circulation or posting of gory pictures of an accident. But there are other ways of making novel presentations. The big signs on Broadway, many of them animated, make an impression because they are different. It is not being suggested that dignity be discarded. It is being suggested that we stop being stuffy, that we consider new and novel ways of presenting material to the worker which will capture his attention.

The *receptivity* of the group we are trying to reach must always be taken into consideration too. Almost always, subjective factors are involved which determine whether any particular stimulus will secure and hold the attention that is desired. For example, an individual may be preoccupied with his present activity. Why do you suppose you are being asked not to talk to the bus driver while the bus is in motion? Why does a wife wait until after an unusually good supper to tell her husband about the bargain in fur coats she has just learned about that day? A worker who is actively engaged in another matter requiring his attention, such as making out his daily log sheet, is a poor candidate for a discussion of the industrial health problems associated with his activities.

In addition, the *wants* or needs of the worker will affect the attention which can be secured. Did you ever pay as much attention to local architecture as when you were shopping for your house? Were you ever so interested in kitchen stoves as when you were last looking at apartments? Don't you notice the new cars on the road much more when you are toying with the idea of buying one yourself? A worker will be much more interested in what we have to say if he or his group is specifically interested in improving working conditions, or if he has reason to suspect that the current working situation may not be the best for his health. He will be more receptive if he has heard that another firm, per-

haps a competing company, has better working facilities or better health protection.

The *mood* of the individual will also have a bearing upon his receptivity. If he is annoyed, unhappy, truculent, belligerent, full of resentments, suspicious, he is not going to be in a very receptive mood for our efforts in worker health education.

There are other factors that may have a bearing too. Most people like to be in *style*, whether they will admit it or not. Interest in health and safety has appeared in certain labor areas to a considerable degree, as in clothing manufacture and in coal mining. If these are successful in the eyes of other organized labor groups, it may become the basis of a broad group interest and under such circumstances it is much easier to get the desired attention of the worker.

Another factor is the matter of precedent or *habit*. If an effective liaison has been established in the past, then this good working relationship will make it much easier to progress in the field of worker health education. Everyone is suspicious of something new. It may be attention getting but it can also be an object of suspicion. If you have operated on the principle that confidence, like loyalty, must be earned and cannot be a matter of fiat, you will be in an advantageous spot. Wise are you if you have engendered in the workers the habit of having confidence in you.

If you have been successful in getting the attention of the worker and have been successful in getting your message across to him, there is still more needed. What you have to say must *mean something* to him. It has to make sense. Intelligent, integrated action in the application of your presented material will be most effective when the man has been completely convinced of its value to him in his working environment.

If you have the man convinced, then he will be *remembering* situations that he has encountered or that now exist that fit in with what you are trying to do and say. He will also be *thinking* about ways and means of applying the things you are telling him to situations that he knows about. He will be able to project this information, to *imagine* things that might happen at locations he knows about by applying the things that you are saying. He will be able to appreciate in prospect what the end result will be of the application of the information you are providing; and, if you are quite successful, you will be able to condition his thinking in the future so that he will consider new situations in the light of general approaches, accepted techniques and procedures—all channeled toward the improvement of the health of the worker.

When Should the Education Process Start?

THE process of worker education should begin when a man is employed. In many plants a portion of this indoctrination emphasizes his responsibility as an employee to cooperate in the areas of health and safety. Rule books covering general aspects in this area may be given the new employee. Make them attractive and simple reading.

With each new job or assignment in a different plant area, the potential hazards of the job should be reviewed. Usually, this would be done by the foreman or supervisor. It might be the operator of a unit. It might be handled in a safety meeting, a special meeting, or by some similar approach.

There should be review periods. This is particularly true if there are to be any changes made in an established routine or program, or if there are additional medical findings to report. Formal or informal, the information should be passed along. An unexplained change in a medical or environmental program will result invariably in a rash of rumors. Rumors start because of a paucity of information. Fear and suspicion thrive in an intellectual vacuum. Prevent a rumor if you can. If one develops, stop it in its tracks—fast and hard—by the prompt and frank review of the problem. Unhappy situations have developed in the past through failure to recognize this cardinal principle.

Check List for Worker Health Education Procedures

IF YOU feel that you are neglecting the area of worker health education and you are consciously trying to do something about it, the following check list may be helpful. It is not intended to be complete. It is not intended to be a consecutive step-wise approach. It is simply a list of points upon which you can question yourselves, that your efforts may have a better chance to succeed.

These points are:

1. Have your objectives and material clear in your own mind;
2. Choose a propitious time for the presentations;
3. Have the confidence of the worker;
4. Be sure that you have the attention of the worker;
5. Make a convincing presentation;
6. Make it applicable to the individual or group involved;
7. Make it "the thing" to do;
8. Enlist the aid, experience, advice and thinking of the worker;
9. Aim for the establishment of good work habits so that procedural patterns will be followed automatically;
10. Follow up with periodic reviews;
11. Watch for rumors and stop them promptly;
12. Utilize all available teaching aids and techniques that are useable and available.

It might be desirable to comment on teaching techniques. Verbal transfer is an accepted technique and the opportunities are limited only by the ingenuity of those seeking to impart information. The worker may receive this information in the job training program, from the supervisor, and from his fellow worker. Meetings can be held to discuss a specific problem and its control, or it can be made a part of other meetings. It can be a subject for union discussion; it can be explored at the time of medical examination. It can be discussed with company personnel making an environmental appraisal of an area.

The written word should be utilized wherever possible. The house organ can be used if there is one, or the union paper. Procedural manuals should include a section dealing with this aspect. Special pass-outs can be prepared. It can be incorporated in a safety manual. Signs and placards can be employed in the control room, on the equipment (as cautions or instructions), or on the bulletin board. Move them! Change them!

Visual aids should be utilized as much as possible. Pictures can be used to show the good and the bad, the right and the wrong, the near-miss and the accident. Lantern slides, movies and animated cartoons may be justified if the group is large, if language is a problem, or if intricate explanations are involved. Posters and charts can be used but should not be so casual as the usual application of bulletin boards in this capacity. Exhibits may be a welcome improvement over the bulletin board. A demonstration may be even better. Perhaps you have access to a graphics department or a training group. They would be of considerable assistance in helping you plan for your task of worker health education.

There are few who will disagree that the industrial hygienist has a responsibility in the health education of the employee. We have attempted to point out some of the aspects of the why, when, where and how of worker health education. There are questions unanswered. There are points with which you disagree. That is good. You will accept and reject. You will acknowledge and deny. But you will be thinking—thinking thoughts that are your own—original and virile. These will be translated into action and we will then be able to review our efforts and realize that we are finally meeting our responsibility for worker health education.

VIEWPOINT OF THE INDUSTRIAL PSYCHOLOGIST

W. A. EGGERT, Ph.D., Chief Psychologist
Lumbermens Mutual Casualty Company
Chicago

HEALTH education of an employee means developing in him (a) a state of mind to work safely on his job; (b) an awareness of, and conformity to certain physiological needs to retain proper physical health; and (c) a mental attitude that makes him a productive member of his job environment.

The common goal of the professions represented here should be to secure complete integration of the diagnostic information and over-all health efforts of the physician, nurse, hygienist and psychologist. Such complete integration is desirable because mental disorders, particularly paranoia,[1] have long been problems to the professions of nursing, medicine and industrial hygiene as well as to the industrial psychologist. "Paranoid personality" is a category applied to individuals showing abortive paranoid reaction characterized by the use of defense mechanisms, suspiciousness, envy, extreme jealousy and stubbornness. By pooling our individual diagnostic findings, we can cooperatively determine how to process these cases as well as those involving involutional melancholia,[2] euphoria[3] or other abnormal mental states.

Our common goal, however, extends much beyond our common interest in the individuals who exhibit abnormal behavior or even a slight deviation from the normal. Our greater common task is that of *providing a desirable working environment for the vast majority of normal people* who are working in business and industry today.

The specific function of the industrial psychologist in the health program is to assist employees in attaining a wholesome mental outlook toward their jobs.

Facts are becoming well established that there is considerable correlation between the mental attitude of an individual and his job performance. If he makes the right adjustment to his working environment, he is likely to produce at a level compatible to his skill and training. If he is not happy and satisfied with his working environment, he is much more likely to perform at a level below his over-all potential.

The industrial psychologist is quick to recognize that the mental attitude of a worker is influenced by many things and many individuals. He is particularly concerned with developing and encouraging coordination of the services provided by the physicians, nurses and industrial hygienists toward maintaining the general health and welfare of the employee. Coordination of the efforts of all these groups is more likely to effect a harmonious working relationship between the employees and management—and to enhance the stress tolerance[4] of both.

Specifically, the industrial psychologist will try to effect good mental attitudes among the employees through his participation in the following 12 types of activity:

1. *Assisting in job placement of employees.* This is done through aptitude testing, individual counseling, and the other "tools of the trade" that are available and are being used to assure good job placement. A person who is working at a job compatible with his ability and in which his skills are best used, is most likely to reflect his attitudes in a favorable way.

The "occupational stress" inherent in certain jobs is of vital importance to the industrial psychologist. He must constantly evaluate this factor in making job placements and promotions of employees. Dr. Shepard stated this problem real-

istically at the IHF 18th Medical Conference when he said the physician "must try to judge whether for the particular individual under observation, increased responsibility is a burden or a joyous challenge. Physical points of weakness, such as visual and hearing defects, flat feet, deformities, and weak muscles are fairly easy to assay and record. It is equally important for the physician in industry to make some estimate of the individual's psychological weaknesses and strengths. This requires some psychiatric orientation, with a full appreciation of the many psychosomatic disorders which may develop as a result of the many types of mental conflict. Among the commonest of these, which the industrial physician must try to understand, are the stresses and strains arising in the home and family."[5]

Dr. J. D. Willems, Medical Department, Kemper Insurance Companies, recently said "When I discover high blood pressure in an employee, I say nothing to him until I am fully informed from all available sources of information as to the causes of the condition. We study and analyze the previous medical examinations, changes therein from year to year, his absentee record and the causes therefor, his personnel record, his general day-to-day behavior both in the office and on trips or picnics. After that we arrange a consultation hour and bring him in to plan a suitable program for living and working. Results show that more than half have had their courses reversed and the condition has come under complete control."

By using a staff approach[6] we can more wisely determine the number of complex problems a worker can take on without becoming upset and frustrated.

2. *Providing intelligent supervision.* During the last few years there has been increasing evidence that industrial psychologists can improve the mental tone of a business by improving the over-all quality of supervision. Training the supervisory staff in techniques for motivating employees to greater achievement is one of the means for effecting such improvement. Let us examine the results of a psychological experiment in which the effects of "reprimand" and "praise"[7] on the amount of work turned out by groups of individuals were studied:

	Results in Work		
Motivation device used	Improved	Same	Worse Results
Public reprimand	40%	14%	46%
Private reprimand	83%	10%	7%
Public reprimand using sarcasm	10%	13%	77%
Private reprimand using sarcasm	18%	17%	65%
Public commendation (praise)	91%	8%	1%

The reactions were approximately the same with individuals of varying levels of innate ability. Psychologically the best results are obtained through "private reprimand" or "public commendation" of people; the worst from the use of "sarcasm," either privately or in public.

3. *Individual counseling.* The industrial psychologist is in an excellent position to assist the employee with adjustment problems that seem to be troubling him, whether they be personal or involve his relationships with his co-workers or superiors. Such counseling might be concerned with his job, his family, his vocation, his working environment, his co-workers, his superiors or the more intimate problems of his own pattern of living.

The industrial nurse, in addition to giving medical care to a plant's employees, often acts in the role of counselor to women.[8] In fact, many times the whole burden falls on her for handling both medical and personal problems.

Industrial psychologists would welcome a more aggressive attitude by the nurse, hygienist and physician toward "degenerative diseases." Problems associated with the climacteric period[9] and obesity are illustrations in point. Cooperative diagnosis and more unified therapy in these and other areas should lead to a lessening of the emotional disturbances which frequently hamper the effectiveness of an employee on the job, and interfere with his normal home life.

4. *Giving direction to the promotional policy of the company.* Someone should be close enough to employees to sense their reaction to the promotional policies of the company. Nothing can so quickly demoralize an organization as discontent with promotional policies. The industrial psychologist is alert to identify the right persons for promotion and to enable employees to understand and accept the basis upon which promotions are made. He can counsel management or employees.

5. *Giving direction to employee benefit programs.* Preparing people to meet the frustrations of retirement and old age is more of a psychological problem than we sometimes think. While some may feel that business is becoming too paternalistic in the many benefits which are being provided, we must, nevertheless, be realistic. If group insurance, pension programs, employee picnics, or even a holiday on one's birthday, result in an improvement in employee morale, we may as well recognize these needs and be prepared to live with them. Our chances of living to enjoy a pension are the best they have ever been and will, no doubt, become better. The average life expectancy is currently around 68 or 69 years, with, of course, thousands of workmen living beyond that point in retirement. We should be alert to preparing employees for retirement, and instituting such benefit programs as will be conducive to a high level of morale among the employees—but still not lull them into a state of euphoria. Such programs should be instituted and carried out in a manner that commands the respect of every employee.

6. *Instituting both formal and informal educational programs.* The industrial psychologist is in a particularly advantageous position for giving direction to educational programs in the average business. Formal education is that training provided by industry which is more or less "classroom bound" around such courses as letter-writing, shop, machine operation, etc. These are

generally designed to give the worker greater proficiency in the job that he is doing or in an area that is closely related to his job. Informal education is executed through such devices as individual conferences, employee publications, improved supervision, bulletins, hobbies, reports, etc. Psychologists find constructive therapy resulting from channeling the interest of employees into either formal or informal education. Hobbies are particularly helpful in relaxing an employee and in reducing the number of cycloids[10] with whom we need to deal. A relaxed attitude toward life is important because rush, "drive" and emotional tension can cause an already elevated blood pressure to rise to even higher levels. This is why doctors generally advise a steady, easy pace during the day and eight or more hours of sleep every night.[11]

7. *Properly interpreting employee thinking to management and management policy to employees.* Employees frequently secure misinformation via the "grape vine." Management, too, is prone occasionally to pick up fragmentary bits of employee thinking and give them misinterpretation. The industrial psychologist is alert to maintaining a proper level of communication between employee and management. By giving direction to morale surveys and other communications, he is able to guide and enhance the accurate channeling of information. It is our belief that the average employee in American business is mature enough to be treated as an adult. If we do this, he will be inclined to treat others as adults too.

8. *Instituting physical appeals which often serve as "psychological lifts" to the employee.* These are provided through directed use of color, guards on machines, music in the working environment, fans, air conditioning, adequate rest rooms, adequate rest periods, Christmas trees and carols at the holiday season. The industrial hygienist, nurse and the Medical Department can be particularly valuable in this respect. An exhaust fan of proper type and capacity placed in the proper position, or the provision for periodic sampling of air for dust and fumes, can change the whole "mental tone" of a factory. The industrial psychologist is alert to these needs on the part of the employee and welcomes the opportunity to work with the industrial hygienist, the nurse and the doctor in making these physical appeals contribute to the over-all attitude and emotional tone of the employees.

9. *Encouraging employees to be "good neighbors in their community."* Business, both large and small, is studying ways and means for making employees more effective as good neighbors in their community. As employees accept their responsibility for going to the polls and voting intelligently at the ballot box, supporting good schools, attending church, and participating in constructive community activities, a better employee attitude should result—and proper participation of the worker in the activities of his community frequently leads to a much better worker on the job.

10. *Giving direction to training executives.* Industrial psychologists are filling a role in the American business scene by participating in training executives for their responsibility. As executives become more efficient in supervisory and managerial skills for dealing with employees, they will contribute toward a good mental attitude among all workers. Today, management is alert to take advantage of every psychological principle that is conducive, not only to the rapid learning of the needed skills to become effective workers, but also to psychological factors that can be helpful to the employee in the over-all adjustment to his job, his co-workers, his family, his community, and his government.

11. *Giving direction and counsel to the safety education program.* There has been considerable study in recent years of the "human factor" as a cause of accidents. Facts are being established that the maladjusted or emotionally unstable person constitutes a real hazard and causes accidents. Considerable interest has also been generated in the relationship between supervision and mental attitudes and accident frequency.

A study made by Dr. Nelson[12] of the University of Chicago indicates that it is quite probable that the way a supervisor handles his people may have some relationship to their accident frequency. This study revealed that two very autocratic supervisors had a ratio of 22 to 26 "lost-time accidents" per year over a five-year period as compared to a plant average of only six. When the two autocratic supervisors were transferred to new departments the accident frequency began to increase in those departments.

In a study of 726 commercial vehicle drivers[13,14] Malo and Eggert discovered the high accident frequency individual was a person with immature living habits, poor personal management of time and money, strong likes and dislikes, impulsive behavior, and unreasonable attitudes.

A closer correlation of the efforts of the industrial hygienist, nurse, physician and psychologist in identifying the accident-prone, plus cooperative therapy aimed at improving his general health should be a worthy project for all of us.

12. *Encouraging greater acceptance by the employee of the recommendations made by the hygienist, nurse and physician.* It is well recognized that an employee is often slow or even "suspicious" in accepting guidance and direction from the professions. Even though there isn't a particle of doubt in our minds that a man's physical and mental well-being will be enhanced, he "builds up" resistance to our program. We can meet this problem in three ways, namely, (a) give him a part in planning, prescribing and executing our recommendations; (b) take advantage of every opportunity to enlighten him through individual and group conferences, bulletins, and demonstrations; (c) provide objective examples of good results which have been attained from our combined efforts in attaining more healthful working conditions.

In the years ahead we should have more combined studies by the nurse, hygienist, physician,

and psychologist of complaints, of harmful working conditions, of morale problems and of many other phases of the workers' physical and mental climate.

Industrial psychology has outgrown its "diaper age" when its function was largely that of putting round pegs in round holes and square pegs in square holes. Today it has at least reached "early adolescence." The young profession is proud of its accomplishments in American business to date. In the years ahead the industrial psychologist will continue his efforts in attaining good mental health for employees. He will do so by (1) assisting in job placement, (2) improving supervision, (3) individual counseling, (4) guiding promotional policies, (5) encouraging employee benefit programs, (6) instituting formal and informal education, (7) maintaining proper employee-management communication, (8) instituting physical appeals to a job, (9) promoting an attitude of good neighborliness and good citizenship, (10) giving direction to training executives, (11) giving counsel to the safety education program, and (12) encouraging greater acceptance of professional recommendations.

References

1. Paranoia—a type of disorder characterized by slowly developing logical, well-systematized delusions of persecution or grandeur.
2. Involutional Melancholia—a psychotic-depressive reaction characterized by depression, agitation, and apprehension.
3. Euphoria—exaggerated feeling of well-being and contentment.
4. Stress tolerance (frustration tolerance)—the nature, degree, and duration of stress which an individual can tolerate without undergoing serious personality decomposition.
5. William P. Shepard, M.D.: Occupational Stress. *Industrial Medicine and Surgery*, 23:1, 36 (January) 1954.
6. Staff approach—modern "team approach" to the diagnosis, understanding, treatment and prevention of abnormal behavior, involving the team work of physicians, hygienists, nurses, psychologists, psychiatrists and other specialized personnel.
7. Briggs, T. H.: School and Society.
8. Women—A Key to Safety in Industry and at Home. *Loss Control*, 30:3 (November) 1952.
9. Climacteric—the life period generally from 42-50 associated with the menopause in women and various related glandular and bodily changes in men.
10. Cycloid—personality type characterized by marked mood variations from elation to depression.
11. The Hare, The Tortoise, and High Blood Pressure. *The Insurance Index*, 16:1.
12. Nelson, Charles W.: Effect of Supervisory Leadership Attitudes Upon Accident Prone Employees. *American Psychologist*, 6:7, 353 (July) 1951.
13. State University of Iowa, Bureau of Labor and Management: "Effective Safety Programs." Iowa City, 1953.
14. Eggert, W. A. and Malo, A. H.: Analyzing Accident Repeaters. *Traffic Digest and Review*, 2:4, 21-23 (April) 1954.

Mental Horizon

Research in human engineering is under way in industry, in the colleges, and in the armed forces. From such research we are learning much needed data about human capabilities and human limitations. Perhaps in the near future we will understand more about such things as: What causes the wide variations in human performance? How can fatigue be controlled? Are physical capabilities governed by mental limitations? Fundamental research in human engineering has already brought us rather amazing disclosures refuting some of our previously held concepts. For instance, a recent newspaper article described tests made by the Air Force to determine the ability of aviators to withstand heat generated by air friction in case of failure of the cooling system on high speed aircraft. The test was simple enough. They put an aviator in an oven and kept raising the heat until the man on the inside had enough and yelled "uncle." The results were unbelievable to the experts who vowed that blood would boil above 200°, because the boys in the ovens didn't yell "uncle" until above 250°. Research in this field may change the fundamental physiological concepts of people. Other tests have indicated that this human body can withstand a lot more punishment than previously believed and that our physical and mental capabilities are tremendous. In fact, considerable doubt has been raised, in my mind at least, that our so-called limitations on such things as effort, strength, fatigue, etc., are mostly mental limitations which we ourselves have placed on our activities and are far below our actual capabilities. It is a kind of "mental horizon" within which we have imprisoned ourselves and beyond which we refuse to explore.

—From "Imagineering in Management," by David D. Long, Jr., in *Personnel Administration*, March, 1954.

The Accident Parade

K. T. JOHNSTONE, M.D., Medical Director
Central Foundry Division, General Motors Division
Saginaw Malleable Iron Plant, Saginaw, Michigan

MOST industrial physicians are without familiarity with statistical procedures. Still they are aware that simple statistical methods exist through the application of which the medical work load in any plant better may be anticipated and even predicted. Every accidental injury in industry (as everywhere else) is an event peculiar to itself. But every such injury shares with all others some common features. At the wholly elemental level are such shared factors as (1) a place, (2) a time, (3) an individual. Confining statistical concern solely to these three items, it becomes possible to learn from immediate and recent medical records much about where, when, and among whom accidents will occur. Readily it will appear that accidents are not evenly distributed as to place, time, or persons. It becomes the purpose of this presentation to offer some elemental statistical procedures to the programs of the industrial physician.

How large a change from an over-all average should be accepted before it can be said that the change is not due to pure chance occurrence? It is not possible to do this on a basis of percentage. In some cases, a 25% change may be meaningless, and in others, as will be shown later, as small a change as 5.6% can be considered a certainty. For the purpose of this report a simple calculation will suffice. The difference between the actual number of injuries and those expected (over-all average) to occur is squared and that product divided by the expected number. If the result of that division exceeds 6.6 it is a certainty that the laws of chance ARE NOT responsible for the difference. If the result of the division lies between 3.8 and 6.6, there are 95 or more chances in a hundred that the change is real. If between 2.7 and 3.8, there are between 90 and 94 chances in a hundred that the change is real. Below 2.7 little or nothing can be said. In this paper all differences which indicate a certainty; that is, 99 or more chances of 100 will be marked with **. Those between 95 and 99 will be marked with *.

For example, it is known that, in Department A, 20 injuries per day constitute an expected average on a basis of man hours of exposure. On Monday of a given week 25 injuries are reported, and on Wednesday of that week 30 are reported. Following the line of reasoning above, the following calculations apply:

Monday $\frac{(25\text{-}20)^2}{20} = \frac{(5)^2}{20} = \frac{25}{20} = 1.25$

Wednesday $\frac{(30\text{-}20)^2}{20} = \frac{(10)^2}{20} = \frac{100}{20} = 5.00$

On Monday the resulting figure was 1.25, far below even the 2.7 mentioned above, and therefore, of no significance. However, on Wednesday the result was 5.00, falling between 3.8 and 6.6, indicating that at that level the possibilities were better than 95 in 100 that concrete reason existed for the increase. At the level of 35 injuries, the resulting figure is 11.25 indicating absolute certainty of an operating cause.

I. Place

THE factor of place will be shown to be of importance. It was found that certain Departments exceeded the expected number of injuries to a degree indicating real difference from that of the plant as a whole.

In the months under question, there was an over-all incidence in the plant of 3.69 injuries per 1000 man-hours of exposure.

Department 11: During this period Department 11 accumulated 52,933 man-hours. The figures are as follows:

Man-Hr.	Act. Inj.	Exp. Inj.	Rate Per 1000 Man-Hr.	% Excess
52,933	249	195	4.71**	27.7

Department 15: During the period of December, 1953, through February, 1954, the figures for this Department are as follows:

Man-Hr.	Act. Inj.	Exp. Inj.	Rate	% Excess
210,716	853	775	4.02**	10.0

We shall return to a discussion of this particular Department later on when discussing the factor of time as related to accidents.

Department 16: The figures for Department 16 for the same period are as follows:

Man-Hr.	Act. Inj.	Exp. Inj.	Rate	% Excess
303,591	1180	1120	3.89	5.4

During these 13 weeks they exceeded the plant average 12 times but always with a rather small margin. Their top rate was W/E December 13, 1953, at a level of 4.66, or 1.25 times plant average. However, that trend has persisted since, and, as of the week ending March 28, 1954, the figures are as follows:

Man-Hr.	Act. Inj.	Exp. Inj.	Rate Per 1000 Man-Hr.	% Excess
392,460	1489	1415	3.80**	5.6

At this level the 5.6% excess indicates a certainty of excessive injuries.

It is shown that Departments 11, 15, and 16 are contributing an excessive number of injuries for the man-hours of exposure.

II. Time

FACTOR two is the time of injury. For years it has been common knowledge in the Medical Department that in certain Departments more injuries will occur on a given shift even though the job operations are the same on the other, or safer shift. Injuries were tabulated by shifts for eight weeks for Departments 15 and 16. The results follow in tabular form.

Department 15:

Shift	Man-Hr.	Act. Inj.	Exp. Inj.	Rate Per 1000 Man-Hr.	% Excess
1	63,360	98	147	1.55	
2	57,600	190	134	3.30**	41.8%
3	14,400	27	34	1.93	

Department 16:

Shift	Man-Hr.	Act. Inj.	Exp. Inj.	Rate Per 1000 Man-Hr.	% Excess
1	91,200	276	286	3.02	
2	91,200	317	286	3.48	16.8%
3	16,720	32	52	1.92	

Lumping the two Departments by shifts, the figures are as follows:

Shift	Man-Hr.	Act. Inj.	Exp. Inj.	Rate Per 1000 Man-Hr.	% Excess
1	154,560	374	433	2.42	
2	148,800	507	420	3.41**	29.7%
3	31,120	59	86	1.90	

The factor of time of occurrence is of major importance and should be considered by supervision.

III. Individual

HERE again it is common knowledge that some workers are always in the Medical Department and others never. Just how accurate is this supposed knowledge? For the same eight weeks period in Departments 15 and 16, as a sample, injuries were tabulated by clock number. How often can an individual be expected to have an injury with a plant accident rate of 3.69 per 1000 man-hours? The mathematics need not be gone into, but on the basis of a 40-hour week, in a period of eight such weeks, four or more injuries indicate with certainty that the laws of chance are not operating. In Departments 15 and 16 the number of injuries reported by individuals during the eight-week period are shown in Table I.

Thus, we see that 9 or 10% of the employees for any one of many reasons may constitute a distinct safety hazard.

From his daily Injury Reports the supervisor can identify those that report four or more injuries in any continuous eight-week period. When

TABLE I.
NUMBER OF INJURIES DURING EIGHT-WEEK PERIOD

No. of Inj. Per Man	Number of Individuals	Number of Individuals	Total Individuals
	Department 15	*Department 16*	
13		1	1
11		1	1
9		2	2
8	1	2	3
7		4	4
6	3	5	8
5	1	6	7
4	6	15	21
Total 4 or more	11	36	47
3 or less	174	302	476
Grand Total	185	338	523

such occurs, it would seem logical to discuss the problem with the worker in a friendly attitude. The job assignment should be critically reviewed. Personnel records should be consulted. A surprising amount of information lies dormant in the past work record here and at previous places of employment.

From the standpoint of the Medical Department, it is advisable that such a person be given a physical examination as soon as the condition is noted. Failing health from any reason is first reflected in a decreased work efficiency. Health counseling at the proper time may avoid disastrous consequences later. It is for this reason that the annual examinations are sometimes thought of as a part of the Safety Program. An examination when the person is in good health is not nearly so important as when there is reason for it. Advice given at such a time will be more effective if the individual sees a concrete need of it.

Such an interview by the plant physician and the supervisor can enormously increase the *esprit de corps* of the individual. The feeling of "belonging" is deeply needed, and to date we have used no effective means of promoting it.

Summary

IN SUMMARY, the Accident Parade of injuries leaves fascinating footprints for those who will read them. It is possible by tabulation and simple mathematics to discern concrete changes in the rate of accident occurrences in the plant.

By consideration of the time of the accidents, it is possible to spot the shift or even the job that is the prime factor in ruining the safety record.

It is completely feasible for a supervisor to know which individuals are involved in an excessive number of injuries, and be certain of his knowledge. Handled correctly, the worker can be led and assisted in correcting the situation. Furthermore, supervisors can now request check-ups on employees knowing that they are needed, the advice may fall on fertile ground.

The Prevention of Gas Gangrene and Tetanus

OSCAR P. HAMPTON, JR., M.D., F.A.C.S.
Department of Surgery, Washington University Medical School, St. Louis

GAS GANGRENE and tetanus are anerobic wound infections caused by bacteria of the Clostridia group. Each is accompanied by a severe toxemia and carries a high mortality. Both are out-and-out clinical diagnoses. Bacteriological studies are unimportant and play a negligible role in establishing the presence of either of these wound complications.

Gas Gangrene

A BRIEF review of the clinical and pathological characteristics of this dramatic and dreaded disease seems in order. Gas gangrene (a better and more descriptive term is Clostridial myositis) always develops as a fulminating wound infection in muscle under the anerobic conditions provided by dead and devitalized tissue in the wound. Although it is encountered principally in war surgery, it does occur occasionally in civilian life. It is true invasive infection with resulting death of previously living muscle and the disease spreads in this way. If gas gangrene goes untreated, the mortality is 100%.

The predominating symptoms and signs which lead to the suspicion of, and demand an investigation for, possible gas gangrene are pain in the region of the wound all out of proportion to that which might be expected, toxemia with disordered sensorium, a rapidly increasing pulse rate, fever, hypotension or mild shock, and increasing anemia.

Pain is the most constant symptom of gas gangrene and is usually the first complaint of the patient. An alarming rapid and feeble pulse may follow the onset of pain. The pulse rate is usually out of proportion to the temperature. It becomes increasingly rapid as time goes on. Toxemia is a most constant manifestation. In the beginning, the patient may be acutely alert and most anxious and concerned about his condition. He is likely to be excitable and even euphoric. Later the picture may become one of complete apathy. While unexplained fever may be a symptom of gas gangrene, the febrile reaction varies. At times it will be quite high and at others it may remain around 100°. A low temperature with a very rapid pulse is an ominous finding. Hypotension or mild shock is a rather constant finding. Hypotension in itself may not be a particularly significant observation but in association with the other symptoms indicative of gas gangrene, it must not be ignored. Anemia develops rapidly and may become extremely severe. Obviously, it must be evaluated in the light of the probable blood loss at the time the injury was sustained or the patient operated upon together with the known blood replacement.

While any and all of these symptoms suggest the complication of gas gangrene, none are diagnostic. The unexplained presence of them, however, particularly pain, rapid pulse and toxemia, demand thorough investigation of the wound on which the diagnosis is established if gas gangrene is present.

Local Findings in the Wound in Gas Gangrene. For the sake of emphasis, it is stated at the outset that abundant gas and a foul odor are not the diagnostic findings. An appreciation of this is essential to an accurate appraisal of clostridial infections. The typical odor in true gas gangrene is a peculiarly sweetish odor and only if secondary putrefactive organisms are present in abundance is the odor pungent and foul. Some gas may be present in the wound but subcutaneous crepitation is not an early sign and often is not present at all. The mere presence of gas in fascial planes is not diagnostic of gas gangrene. On the other hand, its presence in muscle tissue and especially in muscle tissue which presumably was not devitalized at the time of the injury is a different matter and is a most important finding.

Instead of gas, there may be tremendous edema with outpouring of large quantities of serum from the wound. In these cases, the dressings were probably saturated with the exudate and the discharge may have been so profuse that it spilled out the margins of dressings or plaster casts and stained the linens.

The most valuable local sign in establishing a diagnosis of gas gangrene is the appearance of the muscle tissue. Obviously, to examine this, operating room facilities and anesthesia are required and these are indicated in any suspected case of gas gangrene. Dead and devitalized tissue which has been allowed to remain in the wound must first be excised. Then, incisions are made into what undoubtedly was previously living muscle. Early in the presence of gas gangrene, this muscle is pale pink. Later it tends to assume a gray and still later a bluish-gray appearance. Affected muscle has lost its contractility. In a wet type gas gangrene, there may be a

Presented at the Sixty-Sixth Annual Meeting of the AMERICAN ASSOCIATION OF RAILWAY SURGEONS, Chicago, April 8, 1954.

profuse oozing of blood stained serous exudate from the cut surface of the muscle. In a dry type, bleeding occurs only from the large vessels and definitely the cut muscle does not bleed in a normal manner. Muscle which neither bleeds nor contracts is dead and if this muscle was probably viable after injury, it is probably now the seat of Clostridial myositis.

The therapy of gas gangrene is surgical with the adjuvant use of massive doses of antibiotics, adequate whole blood replacement and questionably, polyvalent antitoxin. While local excisions of involved muscle groups and salvage of the extremity are desirable, amputation may be preferable. This is particularly true if the excision of involved muscle groups leaves an extremity of questionable usefulness. In the Mediterranean Theater during World War II no patient with gas gangrene survived without amputation until penicillin became available. With this antibiotic, a few patients survived with local excision of involved muscle groups. Amputaton must always be considered in true gas gangrene, however, and selected as the surgery of choice in doubtful instances.

Gas gangrene must be differentially diagnosed from two other conditions, hemorrhagic shock and anerobic cellulitis. The former is not and the latter should not be difficult. Differentiation from anerobic cellulitis is crucial, however, because the indicated surgery is so different.

Anerobic cellulitis like true gas gangrene is a Clostridial infection but the prognosis is entirely different as anerobic cellulitis is most unlikely to be fatal. The symptoms are somewhat similar to those of true gas gangrene. A high temperature out of proportion to systemic evidence of toxemia is a frequent finding. The symptoms although usually less severe than in true gas gangrene definitely warrant investigation of the wound to rule it out and this must be done in an operating room with adequate facilities.

Anerobic cellulitis unlike true gas gangrene is a localized process without invasive infection of living muscle tissue. Only tissue killed at injury is involved. A very foul odor and abundant gas formation are characteristic findings. The gas may remain collected as a localized gas abscess or it may spread through fascial planes. Massive subcutaneous crepitation is not infrequent. These findings, sometimes erroneously regarded as typical of gas gangrene particularly if a wound culture is taken and reveals Clostridia, are more typically those of anerobic cellulitis. This is the diagnosis unless the characteristic findings in the wound outlined above under gas gangrene are present.

The therapy of anerobic cellulitis is mere drainage of abscesses and involved fascial planes with thorough debridement of dead and devitalized tissue. The surgery required for investigation to determine that true gas gangrene is not present actually usually suffices for the anerobic cellulitis. Obviously, it is exceedingly important to distinguish between anerobic cellulitis and gas gangrene, as amputation which is often indicated in the latter is practically never indicated in anerobic cellulitis.

For a discussion of prevention of gas gangrene, a great deal has been said about diagnosis but it has appeared worthwhile to help emphasize that the prophylactic measures against this potentially catastrophic complication are early and adequate debridement of the wound with thorough excision of the dead and devitalized tissue, an open wound for good drainage (perhaps anticipating delayed closure) and antibiotic therapy. It is difficult to prove that antibiotics are effective in reducing the incidence of gas gangrene but certainly the incidence of this complication was reduced in World War II after routine prophylactic penicillin therapy was instituted in hospitals in the forward area and continued in the base. This lowered incidence, however, was coincident with the period of time when the quality of field medical service and surgical debridements were at their highest as a result of increasing experience. Even so, it is believed that antibiotics used prophylactically did lower the incidence of gas gangrene.

There is then no such thing as passive immunization against gas gangrene. Prophylactic gas gangrene antitoxin is ineffective and is not recommended. No clinical or animal experimental evidence to indicate that it ever was effective as a preventive measure for gas gangrene has been found. The employment of the combined tetanus antitoxin and gas gangrene antitoxin prophylactically developed as a trend in clinical practice after the latter became available during World War I for therapeutic trial. Gas gangrene antitoxin is not used prophylactically by our Armed Forces. Actually, the danger of anaphylactic reaction and certainly the danger of sensitization to subsequent horse serum injection for good cause far outweigh any advantage of giving prophylactic gas gangrene antitoxin.

For sake of emphasis, it is repeated that the only prophylaxis of gas gangrene is early and adequate wound surgery (debridement) with the wound being left open. Anerobic conditions do not exist in a tissue which has sufficient arterial flow to sustain it and, therefore, gas gangrene will not develop.

There have been some most encouraging developments in the field of active immunization against infections by the organisms which cause gas gangrene. Altemeier has succeeded in developing toxoids against some of the more pathogenic Clostridia including the Welch bacillus. In animals, these toxoids will produce active circulating antitoxin sufficient to prevent an active Clostridial myositis after a heavy inoculation of these bacilli. They can be safely injected into humans. He has been able to develop a similar toxoid against other Clostridia but as yet these cannot be safely injected into the tissues because necrosis develops. This work, of course, is most encouraging but awaits further experimental and clinical trial. Obviously, active immunization would be a tremendous advance if it can be perfected particularly in preparation for war.

Tetanus

TETANUS, or lock-jaw, is a very serious wound complication caused by the liberation of a potent toxin by the growth of the Clostridum tetani in the wound. Usually it develops along with a definite wound infection but, in many instances, the actual wound of entry may not be found. It is a true toxemia. The toxin diffuses through the adjacent muscles and by its action on the neuromuscular end organs causes a state of chronic contraction which has been described as local tetanus and which may be the first sign that this disease is developing. There are two theories, "the nerve transport" and the "vascular transport" as to the means by which the toxin is distributed to susceptible cells in the spinal cord, the medulla and the motor end-organs of the skeletal muscles. Tetanus carries a high mortality which in many reported series averages around 45 to 50%.

The incubation period varies from two days to several weeks or even months. A wound in which tetanus spores have been implanted may heal with survival of the organisms and the disease may occur later after secondary operations or simple contusions of the healed wound. The usual incubation period, however, is six to 14 days after injury. The prognosis is poor in those cases with short incubation periods.

The diagnosis of tetanus must be made on the clinical findings alone. While cultures of a draining wound may be made in an effort to verify the presence of the tetanus organisms, such cultures are, for practical purposes, of no significance in establishing the diagnosis. There may be prodromal symptoms of some headache and irritability and there may be some ache or pain in the region of the wound. Usually, there is little fever and the patients are mentally quite clear. The early symptoms of local tetanus which may precede the full-blown disease include muscle cramps and pain in the extremity. A "cog-wheel" resistance to passive flexion and extension of the extremity has been described.

The symptoms of systemic tetanus are stiffness of the neck with or without pain in the back, trismus, difficulty in swallowing, and, finally, convulsions. When the latter are established, they may be initiated by any handling or movement of the patient and any effort on his part to eat, drink, or move himself.

Tetanus is a preventible or almost preventible wound complication. The keystone of prevention of this disease is adequate immunization but the importance of thorough wound debridement and of omission of wound suture to minimize anerobic conditions in preventing tetanus must not be disregarded. Adequate antibiotic coverage is also a deterrent to its development. Even with thorough wound surgery and antibiotics, however, serologic protection is essential.

Passive Immunization with Tetanus Antitoxin. The incidence of tetanus in both war and civilian surgery has been markedly reduced by passive immunization with tetanus antitoxin reasonably soon after wounding. Early in World War I, before the use of tetanus antitoxin prophylactically, the British experience showed an incidence of eight cases of tetanus per 1000 wounded. With the use of 3000 International units of antitoxin prophylactically which is equivalent to 1500 American units, the incidence of tetanus fell to one per 1000 wounded. This clinical experience added to experimental data has established 1500 units as the accepted dose of tetanus antitoxin for prophylaxis and, undoubtedly, it is of considerable benefit in the average patient.

A larger dose, however, for example, 5,000 to 10,000 units, offers greater protection and should be employed in civilian surgery when there is an obvious contamination in a deep wound with material which is most likely to contain tetanus spores, for example, a barnyard injury. Co-existing diabetes mellitus or arterio-sclerotic peripheral vascular disease also warrants the larger dosage for tetanus prophylaxis. The increased dosage should be employed for all wounds warranting tetanus prophylaxis seen later than 24 hours after injury.

Prophylactic tetanus antitoxin in the usual dosage of 1500 units should not be expected to protect for longer than seven days. In some instances, the period of protection may be longer but it is not safe to rely upon a more extended period of immunity. If, therefore, an unhealed wound still contains dead tissue and particularly if it is obviously septic, the prophylactic injection of antitoxin should be repeated every seven days until the wound is free of dead tissue and is healing.

Larger doses of tetanus antitoxin appear to extend the period of protection. With 10,000 units, Cooke found that a protective level of antitoxin persisted for several weeks in most instances, and with 100,000 units, he obtained a protective level of antitoxin in the blood for as long as 50 to 60 days. Since the larger dose of antitoxin will provide more protection during the first week and will extend the period of protection, it is reasonable that 5,000 to 10,000 units should be the dosage selected for prophylaxis not infrequently.

It is important to recall that when surgery is to be performed in a region or even the part manipulated where a wound likely to have previously contained tetanus spores is soundly healed, tetanus may develop and additional tetanus antitoxin prophylactically is indicated. If at all feasible, however, such secondary surgery in healed wounds potentially infected with tetanus organisms should be postponed until the patient has been actively immunized. This is a particularly sound approach to this problem since a patient who has been previously given tetanus antitoxin prophylactically does not obtain the same degree of protection from subsequent injections and each succeeding dose becomes less effective. Moreover, the degree of protection is markedly limited in those individuals sensitive to horse serum and such a sensitivity may have been established by the primary passive immunization. This creates a complex problem as a more massive

dose of antitoxin is necessary to protect such individuals from tetanus but, with it, the risk of anaphylaxis is increased.

Data are not available to cite the actual danger of anaphylactic reaction when prophylactic tetanus antitoxin is administered. Even without these data, however, deaths are known to have occurred from the administration of this serum. In one university center, three deaths on this basis occurred in one year. Some investigators have stated that the danger of anaphylactic reaction is no more than one in 50,000 administrations but others believe it is nearer .5%. The danger of serum sickness is much higher. Certainly, many men in this organization have seen non-fatal if not fatal anaphylactic reactions following the administration of tetanus antitoxin, to say nothing of the many instances of aggravating and disconcerting serum sickness.

The use of tetanus antitoxin should always be preceded by appropriate and meticulously performed skin tests for sensitivity to horse serum. A common error is to perform the skin test with a full-strength serum. The material for this test should be a 1-to-10 dilution of the antitoxin with saline. Only about .1 cc. should be injected intracutaneously. The skin wheal should be about the size of the head of a pin.

A positive skin test indicates the ophthalmic test in which a small amount of the diluted serum is placed in the eye. If both the skin test and ophthalmic test are positive, the danger of anaphylaxis is probably greater than the hazard of tetanus and the antitoxin should not be administered. With a positive skin test and the negative ophthalmic test, the antitoxin may be administered in broken doses with small doses of 1-to-1,000 adrenalin but it should be kept in mind that it has not been proved that such a desensitization program for the administration of the serum is capable of providing an antitoxic immunity. Any patient who showed signs of sensitivity to horse serum and therefore received antitoxin in broken doses should be observed closely for clinical signs of developing tetanus.

Adequate prophylaxis against serum reactions usually may be obtained by the administration of .3 cc. of 1-to-1,000 adrenalin in an oily base immediately prior to the injection of antitoxin, the administration of the antitoxin in broken doses and the use of antihistamine drugs for about 10 days. ACTH is undoubtedly the agent of choice, however, in minimizing the hazard of anaphylaxis and with its use, prophylactic antitoxin might be given without catastrophe even though the skin and eye tests were markedly positive. Thus, with a patient who is sensitive to horse serum and yet has a wound which is an absolute indication of passive immunization, ACTH may be highly advantageous.

From the foregoing, it may be recognized that generalizations concerning passive immunization against tetanus are inadvisable. Prophylactic use of tetanus antitoxin is an individual matter and how, when, and in what dosage it is used, depends upon the judgment of the surgeon. Moreover, it must be clearly understood that tetanus can and does occur in spite of prophylactic tetanus antitoxin. *Passive immunization is not absolute protection.* It is significant, however, that the disease developing after passive immunization usually has an incubation period of more than a week, and often of several weeks, and it usually carries a low mortality.

Active Immunization with Tetanus Toxoid. Prophylaxis against tetanus should be active immunization. Its effectiveness was irrefutably established during World War II when the disease was almost prevented in the British and American Armed Forces. In the majority of those cases which did develop, there was some flaw in the basic immunization or a routine wound booster injection was not given.

It is now well established that basic immunization should be provided with the slowly absorbed alum precipitated toxoid. Combination of alum precipitated tetanus toxoid with diphtheria toxoid, pertussis vaccine or typhoid vaccine is not only satisfactory but the vaccines appear to enhance the effectiveness of the toxoid in producing an active immunity.

The basic immunizing series in the United States Armed Forces at this time consists of three intramuscular injections, although the third is actually a booster dose given routinely one year after the immunization is initiated. The first two injections are given at monthly intervals and the third a year later. In the event of injury between the second and scheduled third dose of toxoid, the third dose is given immediately. A similar regimen with alum precipitated toxoid is applicable to general use in adults in civilian practice. In children, of course, routine active immunization with alum precipitated toxoid combined with diphtheria toxoid and pertussis vaccine is well established, and it is reasonable that a large percentage of the children of this country are now actively immunized against tetanus.

In general, a so-called wound booster of tetanus toxoid is indicated whenever a wound is sustained and moreover, routine booster injections from time to time are indicated. The parents of actively immunized children should be encouraged to have their offspring given booster injections of toxoid from time to time through childhood and teen-age life in order that the active immunity may be maintained. For a wound booster, the more rapidly absorbed fluid toxoid is preferable but for routine booster injections, alum precipitated toxoid should be used.

Duration of active immunity which can be recalled by stimulating doses of tetanus toxoid has not been determined. Our Armed Forces now employ routine booster injections every four years, anticipating always the use of an additional wound booster. Routine booster injections of alum precipitated toxoid every two years appear preferable as this would maintain a protective level of active immunity against unsuspected inoculations in trivial wounds. There is some evidence that an active immunity can be

recalled up to eight or 10 years after the last booster injection, but in these instances the rate of recall may be slow.

The rate of recall or stimulation of active immunity after a booster injection of toxoid is of tremendous importance because not infrequently the incubation period of tetanus is less than seven days and, in such instances, the mortality rate is high. Of the five deaths among the 12 cases of tetanus in the U.S. Army in World War II, four had an incubation period of less than a week. Only one patient with an incubation period of less than seven days recovered.

During World War II, there were only four cases of tetanus in United States soldiers who had received the basic immunizing series and the booster injection of toxoid at the time of injury. Since practically every wounded man received the booster injection soon after his injury, it would appear that the rate of recall of immunity was rapid enough to prevent the disease. This, however, may be merely an assumption. A concentration of antitoxin in the blood stream in the proportion of .01 to .1 units per cc. is considered sufficient to protect against the disease. Since most of our soldiers receive their wounds within at the most a year or two after the last injection of tetanus toxoid, it is entirely likely that many carried a protective level of antitoxin at the time the wound was received. This does not mean that the wound booster should not have been given. It merely means that the very low incidence of tetanus may have been due at least in part and during the first week to the high state of active immunity carried by our soldiers rather than to the effect of the wound booster injection of toxoid.

In this connection, a wounded man in the British Army, even though their soldiers were actively immunized, was not given a stimulating dose of tetanus toxoid but rather was given 3,000 International units (1500 American units) of tetanus antitoxin under the concept that a wound booster of toxoid would not give a sufficiently rapid rise in antitoxin to protect the individual during the first week. That period, of course, is when prophylactic tetanus antitoxin offers its greatest protection. The British held that in previously immunized personnel, any tetanus spores which might have been implanted at the time the wound was received would themselves act as a booster dose and there would be a sufficient rise in antitoxin titer at the end of the week to carry on the protection against tetanus. The British Army had 22 cases of tetanus in actively immunized personnel, which means that their rate of the disease was comparable with that in the American Army.

The foregoing discussion indicates that the rate of recall of a protective level of immunity following a wound booster injection of tetanus toxoid is somewhat controversial. Since there may be valid arguments on each side, it is reasonable that in individuals previously actively immunized with toxoid both a wound booster injection of toxoid and a prophylactic dose of antitoxin might be given at separate sites with separate syringes for a massive wound likely to be contaminated with tetanus organisms, when surgical care of the wound and the administration of the booster have been delayed for more than 24 hours after injury or when more than four years have elapsed since the last booster injection of toxoid. Again, just as with passive immunization alone, the combined recall of active immunity and passive immunization depends upon the judgment of the surgeon in each individual case.

Another controversial matter concerns the question of simultaneous passive-active immunization. Is it possible to begin active immunization with a dose of tetanus toxoid at the same time that passive immunization is provided with tetanus antitoxin in previously unimmunized individuals?

There are conflicting data on this subject. Whenever it is attempted, certainly the two agents should be injected at separate sites and with separate syringes and needles.

At Washington University Medical School, we have under way at this time some investigative work which may throw light on this problem. Data gained will be the basis of a subsequent report.

Therapy of Tetanus. The treatment of this disease is based upon three principles, (1) arrest of the action of tetanus toxin, (2) prevention of convulsions and muscular spasm, and (3) the prevention of aspiration and pneumonia.

The details by which these principles of therapy have been applied at the St. Louis Children's Hospital under the supervision of Drs. Alexis Hartman and Jean Cooke are the basis for the recommended regimen of therapy outlined below. In this institution between 1933 and the fall of 1953, 49 cases of tetanus were treated with only 10 deaths, a remarkably low mortality rate of only 20.4%

1. Sedation. Since 1933 Avertin per rectum in a dosage of about 80 mg. per kg. of body weight expecting to have to give an additional 20 to 40 mg. per kg. has been used to provide sedation. Additional Avertin is given thereafter every hour or two in sufficient dosage to prevent convulsions. Pentothal sodium has been used in other clinics in this country for the same purpose. There is reason to believe, however, that the margin of safety is wider with Avertin than with pentothal, particularly in the hands of those experienced in using Avertin.

2. Tetanus Antitoxin, 50,000 units by vein and 50,000 in the muscle. The administration of tetanus antitoxin is always preceded by the skin and ophthalmic tests for sensitivity to horse serum. If these are positive, ACTH therapy would appear advisable. It is not necessary to repeat the antitoxin during the therapy of the disease as a sufficiently high titer persists in the blood and other body fluids over a period longer than is necessary to neutralize all free toxin produced by the disease.

3. Nothing by Mouth. This is a must. It is

crucial to avoid the hazard of vomiting and aspiration. Gavage is too hazardous.

4. Intravenous Fluids. The emphasis is on maintaining fluid balance as fluid is much more important during the crucial days than food.

5. Tracheotomy. This is advisable in the great majority of instances. It serves not only to short-circuit the effects of laryngospasm but also to permit repeated aspiration of the bronchi. When a death occurs from tetanus in a patient on whom tracheotomy has not been performed, the burden of proof to show that tracheotomy was not necessary rests squarely upon the shoulders of the attending physician.

6. Wound Care. Only obviously infected wounds should be incised and then only modified debridement should be carried out and these only while the patient is under full anesthesia.

7. Special Nursing Care. This is essential 24 hours around the clock to avoid the complications which may quickly be fatal.

The results in this series attest to the efficacy of this regimen of therapy.

(3720 Washington Boulevard.)

Shall Doctors Pay for Their Medical Care?

DOCTORS die before their time. Their average age at death is that of the general population. The life expectancy of physicians should be longer. By the time a doctor achieves his degree, he has survived the hazards of infancy and childhood. He also knows the basic rules of health, and the early symptoms of disease. Why then do doctors die prematurely? In a recent editorial in the *Detroit Medical News*, Dr. Reveno indicates the answer. He attributes it to self-neglect by doctors. Doctors do not apply the basic rules of good health to their lives. They do not seek periodic health inventories; they ignore early symptoms; they do not seek medical aid until it is too late. He chides us for our indolence in neglecting ourselves and for the false notion that we are disease-proof. His admonition merits action. Management and labor have long recognized the importance of health protection for their valuable human machines. Should doctors and the medical profession be less wise in safeguarding our valuable skills? One reason doctors are inclined to neglect their health and that of their families is because of misunderstanding about professional courtesy. Many physicians are reluctant to impose upon the time of a colleague for a periodic health inventory. They are almost as reluctant to seek help when they are acutely ill. They feel that the occasional referral of a paying patient or the presentation of some useless gift is inadequate compensation. They would rather pay as other patients do for professional services rendered. The case against charging physicians and their dependents professional fees is not easily stated. It is emotionally charged. It involves spiritual values. The tradition of professional courtesy is more ancient than written medical history. It existed before the days of Hippocrates. It has distinguished practitioners-of-medicine from members of other professions for thousands of years. When the medical student obtaining treatment asks for his bill, and the older physician places an arm across the young doctor's shoulders and says, "You owe me nothing, lad. Doctors don't charge other doctors," that student catches a vision of brotherhood, of greatness and of nobility, he will never forget. It may be an unreasonable tradition, but it is a magnificent one. It should not be lost in this competitive, materialistic age. The case for charging physicians and their dependents is more simply stated. Physicians would be less reluctant to seek medical care if they paid for professional services. Such care might be sought earlier, might be more complete, and the follow-up care might be more adequate. And, as every physician knows, the patient who pays for his care is more apt to follow and profit from advice.

—*Detroit Medical News*, June 14, 1954.

The Cardiac Can Work

S. CHARLES FRANCO, M.D., F.A.C.P.
Consolidated Edison Company of New York, Inc.
New York City

HEART DISEASE stands out as our greatest medical problem. It ranks as the leading cause of death; outstripping its nearest competitor (cancer) by a ratio of almost three to one. Authorities now estimate that some nine or 10 millions of our people have some form of this disease. As the proportion of older people in the population advances, the number of cases continues to grow. We know that high blood pressure and arteriosclerosis are the two unwelcome companions of advancing age, and it is these two conditions that account for more than 90% of heart disease cases at ages past 50.

Accepted statistical samplings show that in the age bracket from 20 to 39, only 9.4 per thousand —less than 1%—are affected. The rate of incidence rises steadily thereafter, and we find at ages 50 to 59 the rate has advanced up to 45.7 cases per thousand, or somewhat more than 4.5%. Similar to the situation in the population at large there is an increasing number of older workers with heart disease. These mature workers represent a tremendous investment in skill and experience. Obviously, the basic problem that now confronts management is what to do about the older employees who have heart disease.

Our experience shows that the cardiac can work; that he can work safely and that he can do a worth-while job. The formula for keeping his productivity is to be found in the development of an adequate medical service, and coupled with selective placement.

Medical Service in Industry

AN ADEQUATE medical service does not necessarily imply a self-contained Medical Department. In many instances, the size, location and resources of the industry may not permit this. The same ends can be reached by other well recognized means, through mutual aid plans, health centers sponsored by labor unions, group clinics geared to handle a number of small enterprises, or by a private physician acting in an industrial capacity.

Locating the employee with heart disease is the key procedure. Our own case finding methods are not unique. However, these usually deal with the employee who already has cardiac symptoms and often has advanced heart disease. This gives special meaning to our experience over the past five years with the periodic examination of apparently normal persons over 40 years of age. These people had no medical complaints and no apparent symptoms, yet in 15% of those examined we found evidence of heart disease or conditions potentially capable of producing it.

The provisions of the Second Injury Law which require that the employer must be aware of the employee's previous permanent physical impairment give added importance to pre-employment examinations and raise the point of routine electrocardiograms in this instance of males over 40 years of age.

Naturally, the medical service must be prepared to diagnose acute heart cases. Sometimes the responsibility arises when the employee presents himself with a direct medical complaint that spells out coronary thrombosis. In other instances, the symptoms may not fall into a typical pattern. Even when the diagnosis is doubtful, an electrocardiographic study should be made at once. The employee should be placed off duty, and he and his physician advised as to the reasons. This is of paramount importance if we are to avoid a situation that might possibly be construed as an aggravation of a cardiac condition in such a case when an employee continues his usual working activity.

Discovery of the patient should be followed by careful examinations made at regular intervals. This is the ounce of prevention; the greatest factor in keeping the cardiac worker on the job without harm to himself. Often, it discloses a standstill condition or even an improvement that justifies lifting some or all physical restrictions.

We are agreed that there is no one single means or test which can provide a precise measure of the cardiac's work capacity. Even the newer scientific aids, the exercise electrocardiogram test and the ballistocardiogram; while helpful, are by no means definitive. The examining physician must take every clinical factor into account. Important considerations include: (1) type of heart disease, (2) the symptoms and signs of cardiac reserve, and (3) the presence of any other ailments.

On the basis of all these findings, the employee should be placed in a work classification that corresponds with the standards established by the American Heart Association. Any generalization, such as "light work," is meaningless. The value of the job recommendation to industry depends largely on the specific detail that accompanies it. Good practical judgment on the part of the physician will avoid needless physical restrictions and will not only serve the patient's cause but also be of service to industry.

Presented in abridged version at the "Heart in Industry Conference" of the New York Heart Association, Hotel Statler, New York, November 20, 1953.

Selective Placement

PLACEMENT of the cardiac in industry can be approached either by a general method whereby rather standard recommendations, such as "no lifting above so many pounds," "no excessive stair climbing," etc., are made by the physician, or by a specific method adapting the worker to one specific job or type of job. The latter is applicable in those industries in which specific assignment to a particular type of work is practiced.

However, many segments of the utility industry operate under changing job assignments. In addition, there is likelihood of emergency work under conditions of physical and mental stress, inclement weather, overtime, and particular responsibility for the safety of the community and fellow workers. Even clerical groups may be called upon for such emergency service. Under such circumstances it becomes necessary that physical restrictions which are applied to the individual employee should be based on his particular physical condition rather than to the job that he may be called upon to perform.

At Consolidated Edison it has been our experience that many employees although partially disabled because of physical or emotional ailments and unable to perform their full duties are nevertheless capable of productive work. This situation may exist for a temporary period or it may be permanent. In order to permit such employees to continue in gainful employment without risking their own health or the safety of fellow employees, the Medical Department imposes physical restrictions but it does not make any decision as to the specific work assignment. It recommends physical restrictions in accordance with the physical defect present. Under this system each standard restriction is designated by a letter of the alphabet from A to Y, and the letter Z is reserved to cover any special situation and is carefully spelled out in each particular case (Table I).

The decision as to whether these restrictions interfere with the assigned duties is the sole responsibility of the employee's supervisor. Naturally, such a system has to be implemented by a training program to acquaint the supervisor with this responsibility. Our Industrial Relations Team was charged with this training and the Medical Department acted in an advisory capacity.

When there is a question in the supervisor's mind concerning assignment in a particular job situation he can consult with the Medical Department to obtain a more detailed recommendation to fit the specific problem. This type of consultation between physician and supervisor prevents our system from becoming too rigid and allows sufficient flexibility to consider the problem of each individual employee.

The program has been in successful operation for nearly eight years. When the employee, his physician or the union feels that an injustice is present the case is reviewed by a special clinical examination undertaken by a senior physician. This method has worked well, since such decisions by and large have been satisfactory to all concerned.

The Consolidated Edison Experience

IN REPORTING the Consolidated Edison experience, I shall summarize the results of a survey which covers the 24,473 employees at Consolidated Edison for the year 1952. Our supporting tables deal with 896 cases of heart disease; revealing an incidence rate of about 3.6%. If all our known cardiacs, no matter how slight their heart affliction, were included, the picture would be quite different. In reporting for the year 1950, when we tabulated all our cardiacs, over 1,800 cases were included.[1] That showed an incidence rate of more than 7%; a figure that closely corresponded with an earlier survey made by the Eastman Kodak Company.[2]

We have limited this study to employees whose

TABLE I.
STANDARD PHYSICAL RESTRICTIONS FORM CONSOLIDATED EDISON CO. OF N.Y., INC.
PHYSICAL RESTRICTIONS

Manual Labor
A—Only occasional pushing, pulling, or lifting up to 10-15 pounds.
B—Only occasional pushing, pulling, or lifting up to 40-60 pounds.
Climbing
C—No work requiring repeated or frequent stair or ladder climbing.
Driving
D—Not to operate motor vehicles.
E—No truck driving.
Location of Work
F—No continuous inside work.
G—No continuous outside work.
Safety of Others
H—No work involving the safety of others.
Elevation
I—No work above unprotected floor levels or about open excavations.
Live Equipment
J—No work around unprotected equipment carrying electricity, steam, or exposed moving parts.
Hours of Work
K—Work only between the hours of 6:00 A.M. and midnight.
L—No overtime exceeding two hours per day, six days per week.
Atmosphere
M—No coal, coke or ash handling, or work in similar sustained dusty atmospheres.
N—No work in predominantly wet or damp locations.
Temperature
O—No work in constantly changing temperatures.
P—No prolonged work in sustained temperatures below 40°.
Q—No work in artificially produced sustained temperatures above 100°.
Positions
R—No work requiring repeated stooping.
S—No work in crawling, kneeling or cramped positions.
T—No continuous walking or standing and not to exceed 50% of total working hours.
U—No work requiring talking for long periods.
Eyesight and Hearing
V—No work under conditions involving marked frequent light changes (going from light to dark and vice versa).
W—No work requiring acute (normal average) vision.
X—No work requiring normal hearing (ability to hear ordinary spoken voice).
Y—Work requiring only the use of one arm or hand.
Z—Special restriction—not covered by the foregoing—to be written out.

TABLE II.
ANALYSIS OF 896 CASES OF HEART DISEASE CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., 1952

	Totals	Arteriosclerotic Heart Disease	Hypertensive Vascular Disease	Rheumatic Heart Disease	Miscellaneous
Number of Cases	896 (55F)	528 (24F) (58.9%)	292 (26F) (32.5%)	65 (5F) (7.2%)	11* (1.4%)
Full Duty	256 (22F)	126	122	8	0
Limited Duty	640 (23F)	402	170	57	11
Employees with Absence	411 (32F)	230	159	21	1
Disability Retirement	30	17	7	6	
Deceased	36	20	11	4	1

*Luetic Heart Disease —7
Paroxysmal Auricular Tachycardia—1
Lutembacher Syndrome —1
Pulmonary Heart Disease —1
Chronic Pericarditis —1

Survey covers cardiacs with sick absence or limited duty status among 24,473 employees.

heart condition was severe enough to cause sick absence during 1952, or caused them to be placed on limited work assignment. Before we analyze our findings, a few background statistics are presented in the interest of a better perspective:

The average age of males is 45.9 years; of females 39.4 years.

Females comprise 10% of the working force.

The average length of service for all employees is 20.3 years.

About one-third of the males and one-fifth of the females are over 50 years of age.

It is estimated that 70% of the employees do physical work and 30% are on the clerical staff.

Table II breaks down our 896 cases according to the kind of heart disease, the work and attendance record, and present status with respect to employability.

Coronary artery disease—the Table labels this as "arteriosclerotic heart disease"—accounts for 58% of the total. The high blood pressure group —"hypertensive vascular disease"—is next in line with 32.5%; just about one of every three cases. This figure would be higher, but somewhat over 10% of our hypertensives developed definite arteriosclerosis following the original diagnosis and they are now listed in that category. Rheumatic heart disease cases add up to only 7.2%. We attribute the relatively low incidence of this disease to careful pre-employment screening in former years and a downward trend in the overall number of cases due to the use of antibiotics and more adequate medical supervision.

In regard to sick absence, our summary shows that 54%—more than half the total—had an unblemished attendance record in 1952. In a general way it can be said that the absence frequency rate of our cardiacs is approximately 25% below the general average. On the other hand, as might be expected in a group of seriously ill people, the disability and severity rates are above the company average.

Table III presents the facts on the kind of a job the cardiac employee can do. Approximately 30% were able to hold down their regular, full-time jobs without any physical restriction. Of the remaining 70% who were on "limited duty" about half retained their regular jobs, while the others were transferred to lighter duty. Naturally, the clerical workers were least affected in proportion to their number because their normal work assignments were less taxing.

One point deserves special mention. This summary actually covers almost 400 job classifications in which the cardiac is doing productive work. These include all types of clerical and mechanical assignments and a broad range of operating and engineering functions. The corollary to this is obvious, the cardiac who seeks gainful employment must have definite skills and must be able to do a productive job.

Table IV classifies our cardiacs according to age and length of service. Heart disease strikes most frequently during the 40's and 50's. By that time the majority of workers have been on the job for over 25 years. The high point on the chart comes at about age 55, when the average length of service has reached 31 years. It is evident that heart disease affects the workers in their most productive years when their skill and experience are the greatest use to industry.

Arteriosclerotic Heart Disease

THIS FORM of heart disease accounted for 58% of the total cases in this study; and 199 cases are listed as having suffered an actual coronary thrombosis with myocardial infarction. However, it should be realized that some of the older cases of thrombosis are now being carried by the physicians as coronary sclerosis. The majority experienced an acute episode in previous years, some as long ago as 15 years, but 66 cases had an acute coronary thrombosis in 1952. The remaining cases of arteriosclerotic heart disease are classified as coronary sclerosis with some type of myo-

TABLE III.
JOB CLASSIFICATION OF CARDIACS

I. *Full Duty* (28%)		
Non-physical Workers	121	
Physical Workers	135	
		256
II. *Limited Duty* (72%)		
1. Job Title Not Affected		
Non-physical Workers	193	
Physical Workers	121	
		314
2. Job Title Affected		
Non-physical Workers	24	
Physical Workers	302	
		326
		896

TABLE IV.
HEART DISEASE IN INDUSTRY

Length of Service	Age in Years (Active Employees) 20-29	30-39	40-49	50-59	60-65
Under 1 Year	—	—	—	—	—
1- 3 Years	1	1	—	—	—
4- 9 Years	—	4	6	4	2
10-15 Years	—	2	—	—	—
16-19 Years	—	7	12	12	9
20-24 Years	—	—	80	76	38
25-29 Years	—	—	82	177	67
30-40 Years	—	—	12	173	94
41-and Over	—	—	—	5	32

TABLE V.
ACUTE CORONARY THROMBOSIS—1952

Number of Cases		—	66
Average Duration of Absence		—	87.2 Days
Deceased		—	15* (22%)
Retired for Disability		—	5
Returned to Work		—	46 (69%)
*Died in Acute Attack	—10		
Died within 10 Days	— 3		
Died within 4-6 Weeks	— 2		

cardial damage on electrocardiogram or angina pectoris—60%; and a small percentage are listed as "chronic myocarditis" because of non-specific changes on the electrocardiogram in the absence of angina pectoris, hypertension, or valvular heart disease. We know from clinical experience that postmortem examination on such cases would reveal coronary artery disease in many instances. A few cases are classified as arteriosclerotic aortitis without hypertension.

In some quarters there is still a widespread belief that an acute coronary thrombosis almost always results in death or total and permanent disability. Another popular notion connects the attacks with some undue physical exertion on the part of the victim.

A review of Table V refutes these beliefs. Out of the 66 cases of acute heart attacks amongst our employees in 1952, there were 15 deaths; a rate of 22%. Ten of the 15 did not survive the immediate attack. Worth noting, we feel, is the fact that eight of these 10 cases had no previous contact with our Medical Department, indicating an unawareness of their own condition. Most of them died while off duty and at home.

This is not an isolated or unusual report. It happens year after year and explains our conviction that the heart patient who is under regular medical supervision usually manages to keep out of acute difficulty while on the job.

Another glance at Table V shows that the majority of our coronary attack cases returned to work and only 7% were retired for disability. Those who were fit enough to come back had an average duration of 87.2 days away from the job. The fact that so many cases of previous coronary thrombosis are still at work, with nearly 25% at unrestricted duty, is further proof that a considerable proportion are able to resume a gainful occupational status.

Evaluation of the work capacity of the person who has coronary artery disease is an individualized procedure. One could not attempt to cover every situation that should be considered, and as physicians we realize that we have a great deal to learn about prognosis. However, a few general recommendations can be made.

1. The best prognostic guide following coronary artery occlusion is the patient's symptoms of anginal pain or dyspnea rather than the size of the heart, the electrocardiogram or the ballistocardiogram.

2. Persons with angina pectoris should not be assigned to jobs in which the sudden occurrence of anginal pain will endanger the lives of others.

3. The employee who has suffered a recent coronary thrombosis needs limitation on lifting, excessive stair climbing or walking, driving and emergency work in the first six to 12 months.

4. The individual who has made a good functional recovery in the year following an acute coronary thrombosis should not be handicapped by unwarranted physical restrictions. In such cases there are no cardiac symptoms, the physical examination is normal and only the electrocardiogram remains abnormal but does not demonstrate progressive deterioration. The employee should be considered for return to full duty except for the strain of emergency work. These cases fit into the American Heart Association Classification IB. It is estimated that the group with good functional recovery is approximately 15 to 20%.

5. The individual who has made a complete functional recovery following an acute coronary thrombosis generally needs no restrictions of physical activities when he has maintained this status for two years. To confirm the diagnosis of complete functional recovery, in addition to a normal resting electrocardiogram we expect a normal response to the Master[3] "double two-step" exercise electrocardiogram test. These cases fit into the American Heart Association Classification IA and will include a number of cases with acute coronary insufficiency who have recovered. This number unfortunately is small, less than 10%.

6. The majority of the persons with symptomatic coronary artery disease and other manifestations of arteriosclerosis will require restriction of physical activity in regard to heavy lifting, repeated stair climbing, working under pressure and should avoid overtime work. Approximately 75% of our employees with arteriosclerotic heart disease require some physical restrictions.

7. The question of driving motor vehicles by persons with myocardial damage on the electrocardiogram or who have suffered coronary thrombosis raises many serious problems medically and in public relations. If an accident happens to a driver (motor car, bus, or train) who is known to have had a heart condition, the company is apt to be placed in a bad light in the public eye regardless of whether the accident had anything to do with the employee's heart condition. But it seems reasonable that in certain situations where this risk is minimal, the individual who has made a good functional recovery should be able to drive light vehicles up to three-quarter ton and the few who have made a complete recovery may even be able to drive trucks. On the other hand, those persons with active cardiac symptoms should not be permitted to drive at all. Very pertinent to this controversial subject is a communication to *J.A.M.A.* by Dr. O. P. J. Falk[4] in April, 1952, in which he gave an interesting summary of the employment of bus operators with myocardial damage from the records of the St. Louis Public Service Company. Operators who have recovered from coronary thrombosis with myocardial damage are continued in employment unless there is marked hypertension, evidence of severe myocardial damage on the electrocardiogram or by clinical history, or enlargement of the heart

greater than Grade 1 or Grade 2. He reported that no serious accident has ever resulted from the employment of such persons even in the event of sudden death of a bus or street car operator.

Since we are dealing with the most serious phase of heart disease, this seems an appropriate place for a brief discussion of the compensation aspects of acute coronary episodes. The medical literature reports that only 2% of coronary thrombosis attacks occur with severe exertion. More rarely, a severe non-penetrating injury to the anterior chest or the upper abdomen may cause an actual contusion of the heart. If there are no symptoms for 48 hours following unusual effort or trauma, and a coronary thrombosis develops later, it was probably not caused by the effort or trauma. Competent medical authorities are on record that there is no substance to the fiction that work causes heart disease. Patients with coronary artery disease may occasionally drop dead when engaged in unusual or even normal trivial effort. Autopsy generally shows no new coronary thrombosis. Pathologists believe that we should speak of myocardial infarction rather than coronary occlusion or thrombosis because this is not always found. Some feel that it is only those with subintimal coronary hemorrhages and a history of severe effort or physical injury that should be considered for compensation.

However, it is generally accepted that a heart injury such as coronary occlusion or thrombosis when brought on by overexertion or strain in the course of daily work, is compensable, though a pre-existing pathology may have been a contributing factor. It should be recognized that the element of overexertion or strain is one of fact to be determined by the circumstances of the individual case.

Over the past seven years, we have had only seven claims in which an acute coronary attack was believed traceable to strain or to a direct injury to the frontal chest. Five of these were accepted by the Workmen's Compensation Board, and in four of the five, the casual relationship was first noted by our own Medical Department. In the light of this record, there is solid ground for the statement that an adequate medical service in industry can do much to reduce the liability factor in heart disease.

A brief review of the five cases accepted by the Workmen's Compensation Board indicates that three followed unusual exertion or strain. One of these came under the provisions of the Secondary Injury Law for recurrence of coronary thrombosis. It is interesting to note that this employee has made an excellent recovery four years after his second attack. The fourth case developed auricular fibrillation and evidence of non-specific damage on the electrocardiogram following a severe non-penetrating injury to his left anterior chest. In the fifth case, a death claim which was accepted by the Compensation Board, it was our feeling that the effort was minimal (15 pounds) and not unusual and did not constitute a strain.

Hypertensive Vascular Disease

HYPERTENSIVE vascular disease represents essential hypertension and its complications of arteriosclerosis and heart disease. Essential hypertension itself accounted for approximately 23% of this group. It is characterized by an elevation of blood pressure but cardiovascular disease is absent. Nevertheless we consider that a potential etiological factor for heart disease is present. Ordinarily essential hypertension runs a benign course and the prognosis is good, particularly when it develops after 50 years of age. The sick absence morbidity indices are the lowest in the heart disease group. Less than half require physical restrictions. Experience shows that cases of essential hypertension with blood pressure levels up to 180/100 usually will not require physical restrictions. When the diastolic pressure is above 110 or there is evidence of latent coronary insufficiency as may be manifested by the clinical history or sometimes by an abnormal exercise electrocardiogram test, such as the Master double "two-step" test, there is an indication for physical restrictions.

The arteriosclerotic complications of hypertension, such as myocardial failure, coronary thrombosis, or cerebral accident show an increased sick absence morbidity. They are more disabling as manifested by the greater number of employees working at limited duty, 75 %. They also cause an increased number of retirements for disability.

With few exceptions all hypertensive conditions except essential hypertension usually preclude the driving of vehicles, operating automotive equipment and cranes, and performing heavy manual labor or hazardous work. However, this can be qualified in individual cases depending upon (1) the level of hypertension, because a high diastolic pressure 120 or over is of poor prognostic import, and (2) the presence of vascular change in the vital organs, such as the heart, optic fundi and kidneys.

Rheumatic Heart Disease

IN THE PAST the major problem with rheumatic heart disease has been the high disability rate in the fourth decade, but the use of antibiotics and more adequate medical supervision have contributed to a better prognosis. Our current figures show the age incidence to be predominately in the fifth decade, quite near that of degenerative cardiovascular disease. In fact, in 15% of the cases of rheumatic heart disease we found an associated arteriosclerotic heart disease, often with hypertension.

In the work classification of persons with rheumatic heart disease, who have not experienced congestive failure, it has been the universal experience that they can perform surprising amounts of physical exertion without obvious detrimental effects. But the increased survival period of the group with rheumatic heart disease has brought them to the stage where nearly 85% require physical restrictions although in about half of them the restrictions did not materially interfere with working in the job title.

Miscellaneous Heart Disease

THERE were seven cases of luetic heart disease; three with aortitis, two with aortic regurgitation, and two aneurysms of the aortic arch. The remaining four cases consisted of recurrent paroxysmal auricular tachycardia, Lutembacher's syndrome, heart failure subsequent to pulmonary fibrosis and chronic pericarditis. All the cases in the miscellaneous classification had disability which required restriction of physical activity.

Problems of the Cardiac in Industry

THE problem of the cardiac in industry is too big to be ignored. Management and labor are the two parties most directly concerned, but the situation has broader implications. The community also has a stake in the financial burdens and benefits that come from the wrong answers and the right ones. The medical profession has a vital role to play.

While management has an economic reason for using the skill and experience of the cardiac it does look for adequate protection against the real and sometimes unjust liabilities imposed by many state compensation laws. The Second Injury Law in New York State is only a partial solution to the problem of the cardiac, principally because the waiting period of two years has been found to be too long.

Labor must overcome its opposition to changes in pay and advancement when the health and safety of the individual worker necessitate transferral to a less productive job. This does not mean that the employee has to accept unfair treatment or arbitrary decisions from the point of view of actual job performance.

The community should realize that the unfair implication of ordinary working activity in the causation or aggravation of heart disease often leads to more stringent requirements in preemployment and work qualification examinations. It should also be understood that the compensation laws are not a substitute for disability insurance or pensions.

The medical profession should guard against the tendency to take alarmist attitudes in dealing with the cardiac patient. A disability may be induced by undue mental anxiety even when the organic disease is well repaired. Unwarranted physical restrictions and sick absence that is unnecessarily prolonged are abuses that give rise to needless frustrations.

The Workmen's Compensation Board is concerned with determining whether there is any rational basis to sustain the finding of an industrial accident in relation to a heart condition. The conflict of medical opinion sometimes makes this decision very difficult. It has been suggested that the Workmen's Compensation Board could be materially assisted by a panel of qualified medical specialists who would be in a position to render an unbiased medical opinion.

The solution to the problem of the cardiac worker can best be achieved by teamwork between management and labor with the guidance of the medical profession. The present scope of medical practice is limited largely to diagnosis, treatment, and rehabilitation of the cardiac but our ultimate goal should be the prevention, as much as is possible, of heart disease. However, this will require the development of preventive medical techniques and that is a chapter beyond the scope of this presentation.

Summary

THE increasing number of older workers who develop heart disease poses a serious problem to industry because they become affected in their most productive years when their skill and experience are of the greatest value to industry. This problem can be met by an adequate medical service in industry and by selective placement of the cardiac employee. Our experience at Consolidated Edison Company of New York shows that the cardiac can work.

References

1. FRANCO, S. C.: Cardiovascular Disease in Industry. *Indust. Med. & Surg.*, 20:308 (July) 1951.
2. CRAIN, R. B., and MISSAL, M. E.: The Employee with Heart Disease. *J.A.M.A.*, 110, 1 (January 1) 1938.
3. MASTER, A. M.: The Two-Step Exercise Electrocardiogram: A Test For Coronary Insufficiency. *Ann. Int. Med.*, 32:842 (May) 1950.
4. FALK, O. P. J.: Employment of Bus Operators with Myocardial Damage. Correspondence, *J.A.M.A.*, 148:1243 (April 5) 1952.

Dedicated to Ideals

MEDICINE can do much for law; law can do something for medicine; we two together come into relationship with more people; we thus can influence more people; hence, our responsibilities are greater; we cannot shirk our duty, and we should not. Dedicated to ideals, and to the community as the two professions are, we have it in our power to create a better community in which to live.

—HONORABLE HENRY CLAY GREENBERG, Justice, Supreme Court, New York, in a Symposium on the "Medical Witness," quoted in *New York Physician*, June, 1954.

Industrial Medicine—and Disaster

ATOMIC BOMB PREPAREDNESS

A. F. LECKLIDER, M.D., Medical Director
Fisher Body Corporation, Detroit

THE IMPACT of modern bombing, especially atomic bombing, upon a large civil community is so great that it transcends the ability of any medical organization to cope with it.

It is estimated that a single atomic bomb on Detroit would cause 50,000 deaths. Of an estimated 50,000 to 100,000 injured, who survive the first day, 50% are burned: 50% are flash and 50% flame burns. Glass cuts comprise the largest number of injuries. Fractures are prevalent but lower extremity fractures will not escape the flames. Streets are blocked—buildings are burning everywhere. Transportation is cut off. Utilities are wrecked and water is not available to fight fires or drink.

Doctors, either individually, or as hospital staffs, along with the available nurses, are utterly insufficient in numbers to handle the immense influx of thousands of injured resulting from these attacks. Perforce then, every available medical agency in the community must perceive that it has a duty and responsibility to enter into and to participate in practical plans for the first aid, triage and care of the injured. No hospital facility whatever may remain after an attack. Even though they survive, hospitals are not designed for the reception of the injured in masses; neither are they likely to be empty when a holocaust occurs. Nearly all such structures are multistoried, depending upon elevators for the entrance and evacuation of patients. Obviously, the arrival of hundreds of injured would effectively block the entrances and create terrific confusion both within the building and in the surrounding area. Certainly the largest existing hospital facilities would not begin to meet the need.

Ideally then, one might hope that after a bombing there might continue to exist in the community some facilities of large size, accessible to streets, located on ground floors, with a medical staff and supplies, equipped for preparation of food, and with sufficient disciplined personnel of supervisory level of ability available to operate the activity. Many cities have such facilities in the shape of their industries. Industry and its medical facilities should be included in Civil Defense plans for the care of injured in major cities.

Presented at a Symposium on "The Industrial Medical Department and Disaster Control," INDUSTRIAL MEDICAL ASSOCIATION, Surgical Section, Thirty-Ninth Annual Meeting, Chicago, April 29, 1954.

IN A CITY like Detroit, where many large industries maintain rather extensive medical services, it was early realized that these units would be valuable assets in the devastating emergency created by an attack with atom bombs. Initial steps to formulate a plan of cooperation between industrial medical units and the Civil Defense Plan were taken early in 1951. Plans developed by a Committee of Industrial Physicians in cooperation with the Wayne County Medical Society were eventually integrated into the Medical Care Branch of Civil Defense as the Industrial Medical Aid section. Doctors in industry were given Civil Defense assignments, as are all doctors in the city of Detroit under the agency of the County Medical Society. It should be stressed that in the Detroit Plan, medicine in industry pools its resources with those of the community Civil Defense Plan and serves the whole community. There is no restriction of interest or effort to employees or to industry.

Emergency medical organizations formed to replace destroyed hospitals and supplement surviving ones require time for organization—for the assembly of personnel and supplies and for the preparation of reception areas. Under the Detroit Civil Defense plan 67 schools are designated as Casualty Care Stations to be manned by medical and lay personnel who will report to their posts on an emergency signal. These stations, which already have in store a quantity of emergency supplies, must, however, be cleared of equipment and readied to receive patients subsequent to the sounding of the 'alert' alarm. Any medical facility already in existence becomes therefore of inestimable value, particularly in the earlier moments of the emergency. In Detroit, industrial medical facilities are widely distributed so that some of them would probably survive unless the city were entirely destroyed. Most of the larger industries have a staff of full-time physicians as well as a considerable number of nurses and trained first aid men. In addition to this professional personnel, many industries have trained their supervisory and plant protection forces in regular Red Cross training courses. In a plant of moderate size this means that in addition to regular medical personnel, there may be available a force of scores or hundreds of individuals trained in first aid.

Under the Detroit plan, industrial medical services are urged to carry a reserve of basic supplies

equal to three month's usage. This reserve has been supplemented by a considerable quantity of medical and surgical materials and litters, assigned to Stations within the city limits through the Civil Defense Organization.

IN ORDER to integrate the industrial medical services of Detroit and vicinity into the overall Civil Defense Plan, a survey was made initially of all industry in the Detroit area. Its objective was to determine the size, location, accessibility and personnel of each industrial medical facility. This information was obtained from the physician responsible for the medical activity of each plant or industry in the area. Based on this information, the facilities were classified either as Industrial Casualty Care Stations or as First Aid Posts. Industrial medical services may be designated as Casualty Care Stations when they have facilities sufficient to permit the care of a number of accident cases simultaneously; when they have a full-time physician and a staff of trained personnel, and when their location permits easy access from the outside and quick expansion into adjacent areas of the plant. As a result of this survey, 45 of the larger organizations were designated as Casualty Care Stations. About 150 less extensive plant Medical Departments were designated as First Aid Posts.

A Casualty Care Station receives seriously injured cases brought in by ambulance or by rescue teams on litters as the result of atomic bombing. Definitive treatment is given for shock, hemorrhage, and burns. Emergency surgery is performed on cases requiring immediate intervention to save life. Patients are evacuated to emergency hospitals, or to hospitals outside the city area as soon as transportation is available and condition of the patient permits.

A First Aid Post cares for ambulatory cases only, and after emergency treatment directs its patients to the rear for further care. First Aid Posts will fly a Red Cross flag in emergency to designate their location.

Under the conditions prevailing after a bombing attack, with thousands of wounded flooding every medical facility, much additional medical personnel and supplies will be required by the industrial Casualty Care Station. Under the Detroit plan, such help will be sent by Zone Leaders in control of all emergency medical facilities of the 10 zones into which the city has been divided. The zone commander, in constant contact with the central headquarters of the Medical Care, will dispatch necessary medical or other personnel from Casualty Stations of his zone where the doctors and other trained personnel are assembling according to their Civil Defense Assignment.

BECAUSE they are always staffed, many of them day and night, industrial medical services will be the first medical units, aside from surviving hospitals, which will be available to care for the injured immediately following an attack. They will instantly swing into action, bringing out reserve supplies and occupying adjacent plant areas such as cafeterias, auditoriums, etc., which have been cleared for the purpose. Suitable entrances will be set up and preparations made to handle injured in large numbers. Regular and auxiliary personnel will report to previously assigned posts in the plant. Plant rescue teams, already organized among those with first aid training, will assemble.

Plant supervision, accustomed to controlling groups of employees, becomes responsible for clearing plant areas for the reception of the injured. It directs the transformation of parts of the plant into a large reception center, opening up connecting areas and offices to enlarge the Medical Department, creating more operating and dressing rooms, etc., and preparing other areas for litter cases. It segregates those portions of the plant, according to plan, which are to be utilized for medical facilities, marks aisles and areas to provide for the orderly progress of patients through the stages of reception, triage, treatment, and evacuation. It organizes litter teams, and makes the preparations necessary for the handling and transport of patients within the station in an orderly manner. The medical personnel functions as the experienced nucleus around which the suddenly expanded organization works.

THE SECTION on 'manpower assignments' automatically takes control of the unassigned manpower of the plant, and places them on tasks outlined under the seven subdivisions of station operation.

The key to successful operation under the conditions then obtaining is organization. No expense need be involved—no extensive stock of unusual medical supplies need be purchased, no expenditures for standby electrical equipment, or beds, or large stores of blankets or extra operating room equipment is required. The one requisite, aside from a satisfactory nucleus of regular Medical Department personnel and equipment, and adequate space, is an organized plan of action.

Plans must be devised for quick expansion of facilities and the effective use of manpower. Supervision must be familiar with the plan and its own responsibilities. Finally, any plan involving an industrial plant must have the approval of management. Since so little need be expended and so much could be accomplished, the time and effort spent in evolving a workable plan would seem to be worth-while. Perhaps the public would appreciate this evidence of industry's public spirit.

Medical Departments of industry in Detroit have given a good deal of consideration to the problem of care of the injured after atomic bombing. They have provided information as to personnel, facilities, and supplies. Their doctors have accepted Civil Defense assignment. They have stockpiled some basic supplies. Many have drawn up detailed plans of expansion, assigning tasks and responsibilities to key personnel

and providing for the most efficient use of plant and manpower. Large groups of employees such as supervision, plant protection and some maintenance personnel, have received first aid training. Most plants have arranged for typing the blood of employees.

The efficiency and final contribution of the Industrial Medical Department will be measured in large part by the amount of assistance it receives from management in organizing for sudden transformation into a Casualty Care Station and by the extent to which it can avail itself of the services of auxiliary plant personnel, properly informed and instructed in their assignments, when the day comes.

TO SUMMARIZE the contribution which industrial medicine can make to Civil Defense:

Industrial medicine is already there, on the job; it is staffed and functioning constantly. It is widely distributed. It is manned by personnel accustomed to the care of trauma. It has stocks of supplies, and facilities which are often capable of being greatly expanded and enlarged. Its doctors, as leaders of Casualty Stations in industry can marshal the efforts of many. Finally, it is a part of the thoroughly organized, efficient organization which operates so effectively as American Industry. It is this close association with industrial organization that gives industrial medicine its great potential in atomic disaster.

THE GENERAL MOTORS DISASTER AT LIVONIA

GORDON A. EADIE, M.D., Medical Director
Detroit Transmission Division, General Motors Corporation
Willow Run Plant, Ypsilanti, Michigan

ON AUGUST 12, 1953, at 3:48 P.M., began the most disastrous fire in the history of American industry. Within a half hour the giant General Motors plant at Livonia, Michigan, was a raging inferno. The many fire departments which responded to the alarm were unable to bring the fire under control until the plant was a total loss.

Construction of the plant had started in 1949. It housed the Detroit Transmission Division, manufacturer of hydramatic transmissions; a portion of the building was also occupied by the Ternstedt Instrument Division. The newest addition to the building was still under construction. Designed by some of the best engineers and architects in the business, no one believed that this beautiful modern fireproof building *could* burn. When I first heard the plant was on fire, I thought people were kidding. But when we began to smell smoke and the plant Medical Department became hot we moved out.

The fire began in one of our machining departments near the center of the plant. It was set off by a welder's spark which ignited a kerosene-like rust proofing agent in a drip pan under a conveyor about 12 feet above the floor. Since the drip pan was long and fairly narrow it provided a perfect channel along which the fire could spread rapidly over a large area. Plant protection men and the supervisors in the area started fighting the fire immediately with the extinguishers available, and other equipment was summoned. However, owing to the difficulty of fighting a fire so high above the floor, it was soon out of control and spread rapidly. Also the roof began to burn and the fire fighters were forced to retire before the advancing flames. A strong west wind aided the rapid spread of the fire, especially into the Ternstedt Instrument Division, which occupied the southeastern corner of the building. All of the three fatalities directly resulting from the fire occurred in the Ternstedt area.

By about 4:00 P.M., some of the men who had been fighting the fire at the start reported to the Medical Department with superficial burns. By this time the entire plant was being evacuated rapidly. Our Medical Department was on the east wall of the plant adjacent to the Ternstedt Division. Our medical staff then started what the Army calls "a strategic retreat." With the aid of patients and several volunteer helpers we set up a mobile first aid station out in the parking lot and were in business within a few minutes. In a few more minutes we beat another strategic retreat before the heat and smoke. This we repeated three more times. Our mobility was largely dependent upon carrying supplies and equipment by hand or on a stretcher cart. The dense black oil smoke produced a tremendous cloud, moving rapidly eastward before the strong west wind. This cloud was seen at distances of 20 to 30 miles.

By about 4:15 P.M., our mobile station had settled in a neighboring backyard, and water was available via a garden hose. Casualties had consisted of minor burns due to heat and smoke.

At this point we sent one of our nurses to set up a small first aid station at the west gate of the plant. Dr. Robert MacIntosh, Medical Director of the Ternstedt Instrument Division, and his nurses had set up a station at the east gate and were doing a splendid job.

By now, I deemed it desirable to check the areas outside the south and west walls of the plant where the offices were located. Here I learned that the heroines of the fire were our telephone operators who, in the tradition of the Bell System, had courageously stayed at the switchboard until literally driven out by the flames. Being on the second floor they had to be brought out through a broken window and down a ladder. Several of them had received first aid by supervisors and were taken to the nearest

hospital by ambulance. Also a hero was a telephone repairman who happened to be at the plant. It was he who was largely responsible for the rescue of the operators. He sustained minor lacerations plus smoke prostration. Another casualty was one of our executives who had assisted extensively in rescuing our office force. He had been caught in a second floor corridor by the onrushing smoke and became semi-conscious. Miraculously, he was rescued through a broken window. He sustained moderately severe burns of the cornea of both eyes and a bronchiolitis and pneumonitis from the smoke and heat. After several weeks he was able to return to work.

To check on the condition of casualties who had been taken to the hospital, I ran to a pay telephone in a drug store. Here the operator told me that all circuits were hopelessly tied up. Returning to the east side of the plant, I found that our mobile first aid station had been moved to a partly finished bank building across the highway. Water and electricity had been brought in. Also my associates, Dr. Hranchook and Dr. Harkaway, who had been at our Detroit plant, 20 miles away, had arrived and had the situation well in hand.

As the fire burned, it gradually worked its way northward so that the south part of the plant cooled off first. Fortunately, our Medical Department was protected by a fire wall so that the only damage was that caused by smoke and water. By about 9:00 P.M., the area had cooled down sufficiently so that with flashlights several of us were able to go in and bring out much needed supplies, such as oxygen and blankets. Many of the firemen overcome by smoke were requiring oxygen and some received artificial respiration.

Communications and Liaison

AFTER the first 20 minutes or so, we were dependent entirely upon messengers on foot or in cars and so liaison was at times difficult. I made it my business to move from station to station in order to coordinate medical activities. We also kept in touch with our plant management. There were many requests for information regarding casualties both from the press and from anxious relatives. So far as practicable, these were channelled to our Industrial Relations people.

Help from Outside Sources

A NUMBER of industrial physicians and other doctors from the surrounding area offered their assistance. However, thanks to the remarkably small number of serious casualties, it was not necessary to avail ourselves of these generous offers.

Very early in the fire, state and local police were on hand and were later assisted by Boy Scouts. The Civil Defense organization went into action as soon as news of the fire was received. The Civil Air Patrol Rescue Squad was first at the scene. Ambulances arrived quickly; the Red Cross and Salvation Army canteens were soon serving firemen, victims of the heat and smoke, and others with coffee and sandwiches.

The fire continued to burn throughout the night. The next afternoon the worst was over. Except for the office area, the powerhouse and a portion of the east wall, the plant was a total loss—a smoldering shambles of crazily twisted steel and mortar. We found, however, thanks to our fire wall, that all our medical equipment was intact. Also, and even more important, our records were undamaged.

Summary and Conclusions

IN THE greatest disaster by fire, so far as property is concerned, in the history of American industry, the mortality and morbidity were phenomenally low. This can be largely ascribed to the courageous efforts of those who held the fire in check at first and to the cool-headed efficiency with which our supervisors effected the evacuation of the plant. Casualties comprised four groups: (a) the three deaths, due principally to asphyxia; (b) minor lacerations and burns; (c) anoxia and shock resulting from heat and smoke; and (d) the one case of serious eye and lung damage.

The plant medical staff and equipment were quite adequate to meet the crisis. Had there been many more casualties reinforcements of staff and supplies were immediately available. Mobility of first aid stations was essential, and stretcher carts were very useful in moving patients and supplies.

First aid training, which we have given our supervisors and plant protection staff over the years proved valuable. We plan to include more of our people in this program.

The Civil Defense organizations of Livonia and surrounding communities met the crisis magnificently. We owe all participating groups a great debt of gratitude.

Liaison at the plant and outside communication presented problems. However, for the future we know that the Bell System can quickly supply field telephones, etc., as needed. The Red Cross can also supply them. Our Plant Protection Department has a short wave broadcasting system. This includes several "Walkie-Talkie" units, which would be of value to our Department in an emergency.

We are now in full production at our Willow Run plant. Every possible step has been and is being taken to prevent a recurrence of the tragedy of August 12, '53. Nevertheless, we feel it is imperative to continue to develop and strengthen our disaster preparedness program.

One of the major obstacles to preparedness for disaster is the indifference and apathy of the people. This is largely because disaster is something vague and far off. People do not see how preparedness relates to daily living *right now*. However, the Livonia fire pointed up in a significant way the importance of this day-to-day experience.

The real reason why the evacuation of the plant went so remarkably well is that the supervisors did the right thing in the crisis. They kept their heads and got the people out. Many

workers impulsively started toward their lockers in order to rescue their belongings. But supervisors stopped them and forced them to leave the building. Now why did not the supervisors first try to get machines and equipment out? Because supervisors are promoted from the ranks largely owing to their interest in and understanding of people. As supervisors, their primary responsibility is for their people. It is *this day-to-day concern for their employees* which conditioned these men to react in the crisis as they did. On the basis of this observation we may conclude that a basic ingredient of disaster preparedness is the inculcation into as many of our people as possible of a high sense of responsibility and a more than average concern for their fellow men.

THE WACO TORNADO

H. JAWORSKI, M.D.
Waco, Texas

MOST of you are familiar with the events of the tornado last May, at Waco, Texas, its terrible destruction to our city, and the tragedies which resulted from it. It was on May 11, 1953, following an unsettled rainy day, that at 4:40 in the afternoon, the tornado struck our town of 100,000 population, most of whom had never seen or heard of a tornado, much less believed that one could strike our locality. Within less than five minutes, and it seemed to me only 30 seconds, and I was in the middle of it, $57,000,000 property damage was done and 114 lives were lost.

As soon as possible, our emergency organizations were set up for work and the sick and injured cared for. We owe a lot of thanks to the work of the Army authorities and Army personnel, as we have a large airfield near the city limits and also Camp Hood is located nearby. They supplied men and equipment, and took over the great task of clearance work, while our medical organization, later assisted by the Red Cross, took over the care of the sick and wounded.

Some of us who had training and experience in World War II were better equipped to cope with the emergency and took the lead in the organization for the care of the casualties. It was a great surprise, and I say it with a great deal of pride and satisfaction, how quickly and smoothly the sick and wounded were cared for. As may be seen from the statistics, only one person died after admittance to the hospital, and that was a cardiorenal failure, following multiple fractures and a severe crushing chest injury.

THE WACO TORNADO

Treated in Hospitals:	
Major Injuries	276
Minor Injuries, including Emergency Care	947
Total Cases	1,223
Deaths after Hospital Admittance	1
Cause—Cardiovascular—Renal Failure	
Types of Major Injuries:	
Fractures	75%
Shock, Multiple Lacerations and Hemorrhage	20%
Other Injuries	5%
Tetanus or Gas Gangrene	None
Lessons Learned from this Disaster:	
1. Necessity of Preparedness.	
2. Organization.	
3. Cooperation between Local and National Organizations.	
Dangers: Fear; Panic; Confusion; Chaos.	

Expenditures and Profits

MANAGEMENT is well aware that a decrease in expenditures is not necessarily synonymous with an increase in profits. Most of you can cite instances where a relatively petty saving at one time has necessitated relatively large and unavoidable expenditures at a later time. Similarly, increased or new expenditures are often considered the shortest way to previously unrealized profits. The concept is an infectious one which, I am sure, returns annually under many guises to plague budget directors. Many such propositions are approved and subsequently justify the faith placed in them. Probably more fall short of expectations. I fear that medical services are usually "sold" to management on such a basis. The argument is familiar to all of you. Spend a thousand, 10 thousand, or a million dollars per year on employee health services, and we, the doctors, will provide a Utopia in which the chronically ill employee is replaced by an exuberantly healthy, happy, and productive worker. Somehow or other the millenium has not arrived in spite of the provision of various amounts and qualities of medical service to employees for a number of years.

—From "The Cost of Medical Services," by LEO WADE, M.D., in *The Medical Bulletin (Doctors in Oil)*, March, 1954.

Symposium on Instrumentation for Industrial Hygiene

UNIVERSITY OF MICHIGAN
May 24-27, 1954

INDUSTRIAL medicine may be an art, but industrial hygiene is a science. This was demonstrated at the Symposium on Instrumentation for Industrial Hygiene, conducted by the School of Public Health and the Institute of Industrial Health of the University of Michigan, which was attended by 609 registrants.

Perhaps for the first time anywhere a near-week long assembly was devoted exclusively to an exposition of the tools of industrial hygiene along with appropriate conferences descriptive of these instruments.

The exposition occupied seven halls at the University of Michigan's Rackham Memorial Building. Eight groupings of instruments were exhibited, with some overlapping:

1. Instruments for sampling and analyzing air for contaminants.
2. Instruments for specific tests in industrial hygiene.
3. Instruments for measurement of atmospheric pollution.
4. Instruments for measuring air velocity and metering air.
5. Instruments for measuring sound and other vibrations.
6. Instruments for measuring ionizing radiation.
7. Instruments for measuring ultraviolet, visible and infrared energy.
8. Non-commercial instruments ("home-made" instruments).

The number of exhibiting commercial manufacturers in this non-commercial exhibition was 90, but since the number of instruments for the numerous exhibitors averaged five, the total number of technical devices on display approximated 450.

Of importance equal to the instruments themselves were the conferences conducted in various auditoriums descriptive of individual instruments and classes of instruments. Some of these were conducted by manufacturers; others represented comprehensive reviews within the eight areas earlier indicated.

The concepts and purposes of this Instrumentation Symposium were presented by Dr. William P. Yant, Dr. Allen D. Brandt, and Dr. William G. Fredrick.

One exhibit hall was devoted to "home-assembled" instruments in which more than 100 devices, large and small, were presented. In a measure the descriptive term applied constituted a misnomer. It may be believed that only a few of the instruments actually were assembled at home. Instead, a better term would have been "non-commercially manufactured" instruments. Without doubt the majority of those instruments exhibited and available commercially were at one time in the stage of "home-assembled" instruments. This may mean that the non-commercial apparatus represented the newest developments in instrumentation, some of which later will appear in the catalogue listings of manufacturers.

In addition to the exhibition staged in the halls of the Rackham Building, mobile laboratories assembled on trucks to the number of six were grouped near the entryway to the building. These mobile laboratories were exhibited by the Bureau of Smoke Abatement, Department of Building and Safety Engineering and Division of Industrial Hygiene, Detroit Department of Health; Division of Industrial Hygiene, Pennsylvania Department of Health; General Electric Company, Aircraft Nuclear Propulsion Department; the International Joint Commission; Kettering Laboratories, University of Cincinnati; and the U.S. Public Health Service, Radiologic Health Unit.

The remarkable feature of this Instrumentation Symposium was the fact that it existed at all and attracted the presence and outstanding interest of instrument manufacturers on the one hand and industrial hygienists on the other.

Although industrial hygiene is a newcomer in the listing of the sciences, it was not born with instruments in its hands. Apart from chemical procedures, the industrial hygienist in the early decades strikingly lacked devices that accurately would disclose quantitation in relation to dusts, vapors, gases, mists, rays, etc. Among those present were a few who participated in the earliest industrial hygiene laboratory activities in the United States. These forerunners fully were in the best position to embrace the contrast between the unreliable instruments of the early beginnings and the type on display in this Symposium, many of which were characterized by automatic features, with instruments collecting, analyzing, and sometimes recording at predetermined periods and at a dozen different locations in a manufacturing area. Without in any degree decrying modern instrumentation in industrial hygiene, it becomes apparent that today's commensuration has become so elaborate and so mechanized that no longer may industrial hygiene be regarded as simple.

Any little-informed attendant at this Symposium might reach the conclusion that this four-day assembly of instruments together with numerous technical conferences may have required some six to eight weeks of planning and deliberation on the part of the staffs of the Institute of

Industrial Health and the School of Public Health, together with some non-university collaboration. The truth is that the first meeting of the small initial planning group took place on February 12, 1953, more than 14 months prior to the consummation of the Symposium. The initial effort led to the construction of a planning committee originally of 21 members on a combined local and national basis. An early step was the ascertainment of those agencies willing to cooperate with the university divisions in promoting, sponsoring, and staging this enterprise. These cooperating agencies proved to be the Air Pollution Committee, American Meteorological Society; American Conference of Governmental Industrial Hygienists; American Industrial Hygiene Association; Bureau of Industrial Hygiene, Detroit Department of Health; Division of Occupational Health, Michigan Department of Health; Industrial Hygiene Foundation of America, Incorporated; Occupational Health Division, U.S.P.H.S., Scientific Apparatus Makers Association; and Instrument Society of America.

The next stage involved the expansion of the planning group through the organization of 10 major subcommittees and chiefly eight committees for the devising of exhibits and conferences within the specific eight technical areas already mentioned, as, for example, the subcommittee on the measurement of sound and other vibrations. The large and small committee meetings throughout the 14 months of preparation are to be counted by the score. A few committees assembled on as many as 10 different occasions. Still unlisted in this recital as to the work involved in a university enterprise at the level of this Instrumentation Symposium are the scores of unnamed associates serving in secretarial capacities, arranging for labor in connection with the exhibits themselves, in the planning of hotel accommodations, etc. All this perhaps may be summarized in the statement that this enterprise led to more than 27,000 items of post office mailing.

IT IS THE accumulated experience of the School of Public Health and the Institute of Industrial Health that the major value of intense training periods derives from the published proceedings that follow. Guided by this experience the University of Michigan, in cooperation with the U.S. Public Health Service of the Department of Health, Education and Welfare, has in process of assembly and publication an elaborate encyclopedia descriptive of all the instruments presented at the Symposium together with the printed record of the conferences and other discussions. The date of the appearance of this publication will be conditioned by promptness on the part of the exhibitors in supplying technical data and illustrations of their devices. Charges for the encyclopedia will be determined by the actual cost of its preparation and printing. In due course the University of Michigan through the Institute of Industrial Health and the School of Public Health widely will publicize the time of availability of this encyclopedia, its cost, and the address to which orders may be sent. In the interim information may be obtained from Mr. H. E. Miller, Director, Continued Education Service, 109 South Observatory Street, Ann Arbor Michigan.

Industrial hygiene has traveled a long way since those early days when dust samples were collected by sucking air through cylinders of sugar and then melting the sugar as a prelude to dust counting, or the reliance upon a wet sponge to ward off the breathing of dangerous gases of industry. At the other end of the road, the present end, was the Instrumentation Symposium at Ann Arbor where it appeared demonstrated that nothing harmful to health in industry may escape measurement. Industrial hygiene's progress has been swift.

Too Much Money?

MANY lay people feel that doctors make too much money for the work they do. The figures show that the general practitioner works approximately 62 hours a week. Using the 40-hour work week as the accepted union work-week, the doctor works 22 hours overtime. Five hours represents Sunday work—that means double time according to the usual union. In order to determine the hourly base pay, we must assume then that the doctor receives time and a half for overtime work and double time for Sundays. Therefore, the doctor would be credited with 75 hours per week, or 3,750 hours per year. The average net income for the general practitioner in this country is $14,098 annually. When you divide this according to the hours worked, you find that the doctor actually receives $3.70 an hour. Compare this in certain spots with $3.25 an hour for bricklayers, $3.10 an hour for carpenters, and equally high incomes for master plumbers, tool and dye workers, etc. Actually doctors receive compensation for their highly skilled profession only on a par with the so-called skilled craftsmen.

—From "The Doctor and Industry," by R. B. ROBINS, M.D., in *J. Arkansas Med. Soc.*, May, 1954.

Industrial Medical Association

President's Page

IN THE August issue of this Journal, the names of the Association's District Counselors, Committee members and Committee Chairmen for the year 1954-55 will be recorded. The six members of the IMA Executive Committee—which includes the President, the President-Elect, the First and Second Vice-Presidents, the Secretary, and the Treasurer—have concurred in the appointment of each District Counselor and each Committee Chairman.

In keeping with the basic principles of efficient organization and at the same time giving just consideration to the rapid growth and scope of the Association's activities in the industrial health field, teams consisting of two Directors each have been formed to advise and guide selected Committee Chairmen in the performance of their work. Each team includes one Director who has had a year's experience on the Board of Directors and one of the newly elected Directors. The activities of the District Counselors, whose work is of great importance to the future welfare of our organization, will be under the guidance of two teams of two Directors each. The 32 Counselor Districts have been divided into two areas —the Eastern United States and Eastern Canada, and the Western United States and Western Canada.

Before any assignments for Committee work were made each District Counselor was asked to submit the names of physicians in his district who, in his opinion, should be considered for Committee membership. In this manner, 142 names were obtained. Although it has been impossible to include everyone who was recommended, it will be noted that many of the new names appear on the Committee's roster for the first time.

IT IS HOPED that this reorganization will be helpful in the development of competent persons to serve in posts of importance in the Association, and that this may come about in the following manner:

A District Counselor is selected for appointment in recognition of his competency as a physician engaged in medicine in industry in the community in which he is in practice. Furthermore, his interests as applied to the health of the employed person extend beyond his immediate working environment to the environmental economics of the community, city, county, state and nation. And lastly, he has a direct interest in the work and scope of the Industrial Medical Association. In the performance of his duties he becomes acquainted with physicians in his territory who are devoting their interests to the health of the employed person. The District Counselor is, therefore, in an excellent position to recommend candidates for Committee work.

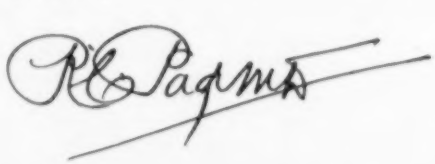
Observing the District Counselors in action affords the Directors an excellent opportunity to determine which ones are deserving of consideration for positions as Directors. In this way, those best qualified will automatically come to the front.

In similar fashion, those Directors who are now in charge of Committee work can obtain first-hand information in regard to Committee members who are doing outstanding work.

In addition, the Executive Committee will have an opportunity to determine which Directors are performing their various assignments in the best interests of the organization. Pertinent recommendations made by the Past Presidents' Committee have been followed. Thus, a group of potential candidates for responsible posts of the future will come to the attention of those whose responsibility it is to make appointments.

OPINIONS of the membership at large are requested in regard to this approach to "executive development" as applied to the future needs of our organization.

Read the President's Page in the August issue of this Journal for a more detailed description of the foregoing.



Guiding Principles of Occupational Medicine

THE Principles of Medical Ethics of the American Medical Association apply to all forms of medical service. This outline has been prepared by the Council on Industrial Health with assistance from the Industrial Medical Association, the committee on industrial health in many state medical associations, and private practitioners as guiding principles for physicians, medical organizations, and others interested in occupational medical service and relations.

Definitions and Purpose

OCCUPATIONAL medicine concerns itself with all aspects of health in relation to occupation. Industrial medicine is a component of occupational medicine provided to employed groups by an employer or other third party with a valid interest. The broad purpose of industrial medicine is the promotion of the healthful well-being of employed persons through services provided at the place of employment or at another convenient facility or location. This purpose is served by: (1) prevention of disease and injury through medical supervision of workers, the work place, materials, and processes; (2) constructive measures such as medical examinations, counseling, and health education; and (3) medical and surgical care to restore health and productive capacity as promptly as possible after occupational illness or injury.

Scope of Service

AN ADEQUATE industrial medical program requires the services of licensed doctors of medicine full time, part time, or on call, depending on size of organization, location, prevalence of potential dangers in the work environment, and other considerations.

1. *Prevention.*—The physician should acquaint himself by personal familiarity with all materials and processes used in the work environment over which he exercises medical supervision to the end that he may recommend appropriate protection of employees against conditions actually or potentially harmful.

2. *Medical Examinations.*—Medical examinations of employees are designed to permit assignment of work compatible with the physical, mental, and emotional fitness of individuals and to maintain their safe and healthful employment. All examinations should be sufficiently complete as judged by the examining physician to protect the health of all workers and to safeguard the public welfare. The need and extent of further examinations must be determined by the physician in accordance with specific requirements, such as (*a*) the discovery of occupational disease, (*b*) the diagnosis of illnesses that may adversely affect the worker, and (*c*) safe return to work after absence due to sickness or injury. Medical records are confidential and should always be kept in custody of the medical department.

In accordance with professional judgment, the examining physician may acquaint the examinee with his findings and may take steps to refer all nonoccupational conditions requiring correction to the physician of the worker's choice.

3. *Health Education and Counseling.*—The physician should take advantage of all opportunities for instruction of workers in hygienic living both in and out of the work place. He may properly give advice about health needs and available community facilities for meeting them.

4. *Medical and Surgical Care.*—(*a*) Compensable Disability: Workmen's compensation laws and policies of medical societies usually govern the provision of medical services for occupationally induced injury or illness. A section of the Principles of Medical Ethics has direct reference:

"Sec. 4.—Free choice of physician is defined as that degree of freedom in choosing a physician which can be exercised under usual conditions of employment between patients and physicians. The interjection of a third party who has a valid interest, or who intervenes between the physician and the patient does not *per se* cause a contract to be unethical. A third party has a valid interest when, by law or volition the third party assumes legal responsibility and provides for the cost of medical care and indemnity for occupational disability." Additional rules of conduct apply:

1. Adequate care of industrial injuries or occupational disease requires that the chosen or appointed physician seek qualified assistance or consultation for all services beyond his ability.

2. An industrial physician shall not, while caring for an industrial injury or disease, urge a patient to have an unrelated concomitant and coincidental disease treated by himself at the worker's expense.

3. When a case is diagnosed as nonoccupational, the patient is to be referred to the physician of his choice.

4. When an employee's personal physician suspects an occupational disease or injury, or when differences of opinion exist as to the compensability of a medical or surgical condition, he should with the employee's consent confer with the plant physician or appropriate company representative.

(*b*) Noncompensable Disability: The treatment of injuries or diseases not occupationally induced is the function of private medical practice. The physician in his industrial relations should abstain from such services except in the case of (1) absence of accessible independent facilities and (2) minor disorders that temporarily interfere with an employee's comfort or ability to complete a shift, for the relief of which he would not ordinarily seek other medical attention. Established standards of medical practice in the community shall govern case finding and immunization programs in industry.

The physician in industry should employ such measures as an emergency dictates in all cases of urgent sickness during working hours on the working premises until such time as he is relieved of further responsibility by the family physician.

The physician in industry and the employee's personal physician should cooperate in those phases of rehabilitation which progress best under medically approved working conditions.

Revision of a publication of the AMA Council on Industrial Health entitled "Outline of Procedure for Physicians in Industry" (in *J.A.M.A.*, March 14, 1942). The Committee in charge of the revision included E. S. JONES (chairman); LEONARD ARLING; PRESTON N. BARTON; DANIEL C. BRAUN; PAUL A. DAVIS; LLOYD E. HAMLIN; ALLAN HARCOURT; A. G. KAMMER; and CLARENCE D. SELBY; and this revision appeared in *J.A.M.A.*, May 22, 1954.

General Relations

1. PROFESSIONAL STATUS.—The physician in charge of an industrial medical service should have position and authority in the industrial organization commensurate with the importance of the duties to be performed and a responsibility for professional acts and policies that will provide adequate safeguards against unethical professional conduct.

2. *The Employer.*—The provision of occupational medical services is regarded as a function of management. Agreements between physicians and employers or other third party are contractual. A contract is not unethical per se, but may be if it (*a*) makes impossible the provision of adequate or competent medical service; (*b*) is contrary to sound public policy; (*c*) evades medical practice acts; or (*d*) has been developed through advertising, solicitation, underbidding, or similar practices. Written contracts are rarely necessary.

A physician's relation to industry is improved if he does not solicit the appointment. However, it is not regarded as solicitation for a physician (*a*) to notify a medical or other association of his desire to secure an industrial appointment or (*b*) to apply for appointment directly or through a recognized placement service as staff physician in an organized industrial medical service or as physician in charge of a plant program without previous or present medical coverage. No physician should replace an industrial medical appointee until the latter has been properly dismissed.

3. *The Employee.*—The health of each person served is the physician's chief concern. He shall provide the same courteous efficient care as he would to a private patient. A physician will not use his industrial affiliation as a means of gaining a private practice amongst plant workers, especially through solicitation, underbidding, or insinuations of reprisal against workers who prefer care by physicians of their own choice for nonoccupational illness. No influence should be brought to bear on employees in their selection of personal physicians.

4. *Nurses.*—Personal medical services involving the establishment of a diagnosis and the definition of treatment or the performance of specific preventive measures are the function of the physician; however, it is desirable for the nurse to participate in such services if she acts under direct medical supervision or under indirect supervision such as is provided by standing orders.

Standing orders are defined as a written compend of directions outlining services and procedures, approved and signed by a licensed physician and acknowledged by him to be services and procedures that may be performed by a certain nurse under certain circumstances. Such orders should not attempt to delegate the exercise of medical discretion but should serve as authorization for approved routine procedures for common minor conditions and as a directive for emergency care of more serious complicated conditions until the physician's arrival.

The physician should be responsible for the instruction and guidance of all medical personnel. There should be no delegation of services requiring expert medical judgment.

5. *Consultants.*—Assistance should be obtained from consultants in medicine, surgery, or hygiene or in other technical specialties whenever necessary.

6. *Official Health Agencies.*—The physician in industry shall consider himself as plant health officer. He should cooperate with bureaus of industrial hygiene in the investigation of hazards and promotion of healthful working conditions, by reporting occupational disease as required, and by accumulating and reporting data on the relation of occupation to disability and mortality.

7. *Workmen's Compensation and Rehabilitation Agencies.*—Medical and surgical care should aim to restore the disabled worker to his former earning power and occupation as completely as possible and without unnecessary delay. Concise accurate medical reports promptly submitted to those agencies entitled to them are a part of this obligation.

Equitable administration of workmen's compensation in part depends on medical testimony which shall adhere to reasonable scientific deductions regarding the injury or possible sequelae to the end that every deserving claim receive just consideration.

8. *Medical Organizations.*—Physicians in industry should participate in the organizational and educational activities of general and special medical societies and of hospitals, to the end that the objectives and contributions of occupational health may be recognized and available to the medical profession at large.

Specific inquiries on matters relating to occupational health should be directed to the appropriate county or state medical societies or to the Council on Industrial Health, American Medical Association, 535 North Dearborn Street, Chicago 10, Ill.

Letters

Unusual Compensation Claim

TO THE EDITOR: Claim-conscious workers in industry often seek new occupational conditions on which to blame their real or imaginary ailments. By way of illustration, the following is a resume of a case with which we were recently confronted. It was the first time a problem of this nature came to our attention, and search of the literature failed to reveal any information to guide us.

In our automobile assembly plant, the employee involved had the job of spot-welding parts of the truck cab cowl outer panel. At the time of his complaint, he had been employed in this capacity for a period of several months. He worked within six to eight inches of a 75 KVA transformer, at knee level, on and off for three to four hours of the working day. The transformer was run at a voltage of 400 primary and 24 volts secondary, with an amperage of 400 to 500 at the metal point of closing, and at six weld time cycles, for a total of 60 to 70 welds per unit.

He stated that he noticed pain and stiffness in his right knee and claimed that his work was responsible. He reasoned that working in line with the transformer caused the electric current to affect his knee. To justify this reasoning, he placed a metal plate about six inches behind his knee, and while no sparks breached the gap between the plate and his knee, he stated that the metal plate was drawn about two inches towards his knee, as a result of the magnetic field, presumably set up by the transformer. With this baffling history, I made a careful examination of the knee. There were no abnormal findings. The man continued to work, but filed a claim with the Compensation Board. His physician stated that there was probable causal relationship and submitted his report to the Department of Labor in support of the worker's claim.

When the case came up for a hearing at the Department of Labor, the referee would not make a ruling. He admitted knowing nothing about such con-

dicions, as he had never had a similar case presented to him in the past. He asked that we submit the opinion of an expert before he would render his decision.

Correspondence with several Medical Directors in the electrical industry did not shed any light on the subject, since they had not had any experience with such claims.

The Electrical Testing Laboratory of New York City was engaged to measure the amount of stray magnetic flux present in the proximity of the welding jig in question. The report of this determination, and the problem involved were then submitted to Professor Kouwenhaven, Dean, of the School of Engineering of Johns Hopkins University. His expert and interesting opinion was as follows:

"1. The magnetism that leaked from the modern well built transformer was negligible.

"2. The statement that an iron plate held six inches in back of the knee was drawn two inches toward his knee is fallacious. It is well known that the attraction for iron set up by a magnetic field increases very rapidly as the piece of iron is brought closer to the source. Therefore, had the stray magnetic field been strong enough to move the plate two inches when held at the distance of six inches, as reported, it would have pulled the iron all the way to the transformer.

"3. I have never heard of a case where a stray 60 cycle magnetic field had any effect on a human body. All of us are permeated by magnetic fields throughout our entire lives.

"4. High frequency magnetic fields of 100,000 cycles or more per second are used to warm members of the body and thereby relieve pain and stiffness. A 60-cycle magnetic field does not produce any measurable heat effect."

When the above opinion was submitted to the referee at a subsequent hearing, he disallowed the claim and dismissed the case.

—Louis J. Berg, M.D., Medical Director,
Chevrolet-Tarrytown, Division of General
Motors Corporation.

"Prelude to Silicosis"

To the Editor: Will you kindly announce the free availability of reprints of a publication entitled "The Permeability of Lung Parenchyma to Particulate Matter." This publication derives from the Industrial Hygiene Foundation within the Mellon Institute. Requests for this reprint should be addressed to Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pennsylvania.

—W. A. Hamor, Director of Research,
Mellon Institute of Industrial Research,
University of Pittsburgh,
Pittsburgh 13, Pennsylvania.

Syphilis in Industry

To the Editor: The American Academy of Dermatology and Syphilology in the preparation of a scientific program hopes to obtain an appraisal of syphilis in industry at the present time.

Those planning the program are interested in knowing, as far as possible, the corresponding decrease of syphilis in hospital studies and in industrial statistics. Originally, we had a large clinic at the Boston City Hospital where we treated as many cases in a day as we now see in a year.

In addition, the writer in furthering that program, hopes to obtain extensive information on the medicolegal aspects of syphilis as involved in workmen's compensation.

It is hoped that this letter may be published in the Journal with the objective that any reader having information on either of the topics above mentioned will communicate with the writer at the address shown.

All information furnished will be accorded that degree of confidence that the correspondent may specify. For the purposes intended, it is not necessary that the industrial plant or plants involved be revealed.

—J. G. Downing, M.D.,
520 Commonwealth Avenue,
Boston 15, Massachusetts.

Books

Rehabilitation

Doing something for the disabled: Mary E. Switzer; Howard A. Rusk. Public Affairs Pamphlet No. 197. Public Affairs Pamphlets, 22 East 38th Street, New York, 1953, p. 28, 25 cents.

Recently a publishing house of the first water rejected a book manuscript ostensibly solely on the grounds that the author was an "unknown." That may have been an error, but that possibility will not be pursued. If "known" names become a requisite what improvement could be made over the combination of Mary E. Switzer and Howard A. Rusk? The fame of the latter will not be dimmed by that minor catastrophe of his name appearing as "Dr. Rask" on the title page—a small happening that probably will cause the proofreader to go around with his right wrist tied to his left ankle until the second printing appears. In fact, the entire pamphlet is disguised. In truth it is no pamphlet but as to contents is a full-fledged text concentrated to the very essence of the requirements of good rehabilitation and the needs therefor. Such concentration makes the reviewer's task difficult, for every page invites comment and quotation.

Only one of the many fetching presentations here may be introduced. This is the well presented fact that those who are in need of rehabilitation cannot be disposed of merely by ignoring them. If they are shunted away from remunerative employment within their capacities still they must be cared for through less commendable and expensive procedures. Here is a situation:

"As our population becomes older, it can be expected that chronic disease and its resultant physical disability will increase correspondingly. Studies show that the higher the age group, the greater the percentage of chronic disease and disability. Lacking a cure for many of the chronic diseases that produce disability, we must depend on rehabilitation to teach the disabled to live within the limits of their disabilities and to the full extent of their capabilities.

"Along with the human factors, there are economic considerations which touch every taxpayer in our country. Each year we spend large sums of state and federal money to maintain thousands of persons who have been forced onto public assistance roles because they are disabled and unable to support themselves and their families. Most of us can readily understand the personal tragedies of these men and women, but few of us have realized that thousands of these people can be rehabilitated and returned to productive, satisfying lives, at a saving of millions in public funds.

"We know this because it already has been done

in hundreds of cases, covering all types of disabling diseases and injuries. The Office of Vocational Rehabilitation of the U.S. Department of Health, Education, and Welfare, working in cooperation with the 88 State Divisions of Vocational Rehabilitation and Agencies for the Blind, recently completed a study of public assistance cases rehabilitated through the state-Federal program of vocational rehabilitation during the year ended June 30, 1951.

"The study found that 66,000 persons had been rehabilitated during the year. Of these, more than 8,000—or one out of eight—had been receiving public assistance. They had been receiving assistance through the Federally-aided programs of aid to the blind, aid to the permanently and totally disabled, aid to dependent children, and old age assistance.

"Assistance payments to these 8,000 men and women had been at the rate of about $5,700,000 annually. As rehabilitated, working members of their communities, their earnings are estimated at $14,000,000 in the first year after their rehabilitation. The expenditure of $4,000,000 to rehabilitate them was less than three-fourths of what it would have cost to maintain them for one more year. As contributing members of their communities, they will pay an estimated $1,000,000 annually in Federal taxes alone."

Well over in this pamphlet is a cartoon emphasizing that handicapped workers are "adaptable," "productive," "careful," "regular," "reliable," and "capable." Would the authors be outraged should this meddling reviewer suggest a seventh item, "available"?

In this day and time when the would-be purchaser of technical books faces the going prices of $12.50, $15.00, or $28.00 for two volumes, it is a bit comforting and easy on the eyes to see that this storehouse of authentic guidance on rehabilitation is to be had for 25 cents—and that is no typographical error.

Industrial Medicine's Hall of Fame

DR. LUIGI CAROZZI
Secretary General, International Permanent Committee on Industrial Medicine
Geneva, Switzerland

Prepared by ROBERT T. LEGGE, M.D., Berkeley, California

Dr. Luigi Carozzi

PROFESSOR LUIGI CAROZZI is probably one of the best-known individuals in the world of industrial medicine; he is noted as an administrator, teacher, publisher, and specialist in industrial medical research. While a student at the University of Pavia, where he received his medical degree in 1904, he did much work in histopathology with Professor L. L. Golgi, and there wrote his thesis on "Night Work."

Dr. Carozzi was born in Pontida (Bergame, Italy), on October 6, 1880. His grandfather, Cesare Fermagalli, was chief surgeon at the Maggiore Hospital, Milan, and there taught and wrote a treatise on Children's Surgery. From the day Dr. Carozzi finished his graduation thesis he continued, and organized his life work in the field of industrial health, first in drafting the Medical Review *Il Lavoro*, the leading Italian journal on industrial medicine, under the Director, Professor Luigi Devoto, of the famous Milan Clinic on Occupational Diseases, then in 1907 taking courses of instruction and field work in industrial hygiene from January to June with Dr. D. Gilbert, Chief Director of Belgian factories. From July to September he was associated with Sir Thomas Legge, H.M. Factory Inspector of Great Britain, and during the remainder of the year with Dr. E. Roth of Summerfield, Germany. The next five years, 1909 to 1914, he was Chief of the Medical Services and Consultations at Professor Devoto's Clinic in Milan. During these years he translated Roth's Compendium on Industrial Diseases into Italian, was honored by the title of docent at the University of Parma in professional maladies, and was appointed Secretary of the Italian Section of the International Association of Labor Legislation. From 1914 to 1918 he served as Medical Inspector of Factories and Ministry at Rome. From 1917 to 1919 he was Chief of Hygiene and Ministry of Munitions at Rome. At the League of Nations in Geneva for 20 years he was appointed Chief of the International Industrial Service, to which he made many contributions. He has published nearly 200 papers in the field of industrial health. During his long residence at Geneva he also held the Chair of Extraordinary Professor of Occupational Medicine at the University of Geneva, being retired in 1950 as Honorary Professor. Four different international industrial medical associations have honored him with membership. At the time of his early association with Professor Devoto at the Milan Clinic he became, in 1906, Vice-Secretary; then in 1918 he was made Secretary General of the International Permanent Committee on Industrial Medicine. At the XI International Congress of Industrial Medicine, which is sponsored by the Permanent Committee, to be held at Naples, Italy, September 13 to 19, 1954, this pioneer veteran industrial physician and Professor will be in evidence, a central figure in the administrative activities.

INDUSTRIAL MEDICINE AND SURGERY

Editor CAREY P. McCORD, M.D.

Associate Editors:
HENRY S. BROWN, M.D.
JAMES T. CASE, M.D., F.A.C.S.
NATHAN SMITH DAVIS, M.D., F.A.C.P.
S. CHARLES FRANCO, M.D.
LYDIA G. GIBERSON, M.D.
CHESTER C. GUY, M.D., F.A.C.S.
EDWARD C. HOLMBLAD, M.D., F.A.C.S.
RUTHERFORD T. JOHNSTONE, M.D.
ADOLPH G. KAMMER, M.D.
ROBERT T. LEGGE, M.D., F.A.C.S.
CHRISTOPHER LEGGO, M.D.
ARTHUR R. METZ, M.D., F.A.C.S.
M. N. NEWQUIST, M.D.
CARL T. OLSON, M.D.
ROBERT COLLIER PAGE, M.D.
OSCAR A. SANDER, M.D.
WILLIAM P. SHEPARD, M.D.
FREDERICK W. SLOBE, M.D., F.A.C.S.
JAMES K. STACK, M.D., F.A.C.S.
ROBERT M. WATROUS, M.D.
WARREN A. COOK, A.B.
HENRY FIELD SMYTH, Jr., Ph.D.
WILLIAM P. YANT, D.SC.
EDWARD R. ASTON, D.D.S.

Overseas:
DR. AXEL AHLMARK, Sweden
PROF. DR. MED. E. W. BAADER, Germany
DR. JOHN F. EUSTACE, Ireland
DR. DOUGLAS GORDON, Australia
DR. GIOVANNI PANCHERI, Italy
PROF. DR. JOSE PEDRO REGGI, Argentina
DR. A. SALMONT, France
DR. G. W. SCHEPERS, Union of South Africa
DR. PERTTI SUMARI, Finland
DR. A. R. THOMPSON, England
DR. A. UYTDENHOEF, Belgium

ESTABLISHED 1932

Publisher A. D. CLOUD

Volume 23 JULY, 1954 *Number 7*

Prelude to Silicosis

OVER the years in scores of publications and in many more scores of lectures and classroom recitals, the mechanism of the manner of entry of respired silica particles into the lung substance has been set forth by earnest authors and speakers firm in the conviction that their representations were beyond challenge. As presented it was claimed that fine silica particles having been implanted upon lung alveolar surfaces were picked up by scavenger cells that had wandered out into the alveoli for just that purpose. Sufficiently laden with particles, these cells moved their burden into lymphatic systems, all for the beneficent purpose of transporting the unwanted dust particles to appropriate areas of harmless deposition. Engorged cells have been photographed and more than a little contemplation has been directed to the consideration of just how many dust particles constituted an appropriate load for the usual phagocyte.

In dramatic fashion it became plausible to believe that the highways of this form of transportation became overburdened and as a consequence relatively large quantities of silica, failed of transportation and, left behind, inaugurated that chain of events culminating in silicosis.

None of this may be true—or it may be true that the major mechanism of entry of such particles may be different. It is possible that silica particles penetrate the lung substance without the aid of phagocytic cells. This is the essence of the conclusions reached by Gross and Westrick of the Industrial Hygiene Foundation in a publication in the *American Journal of Pathology* (30:2, 195, 1954). While the experiments dealt with carbon dust, implications are that other dusts enter the lung parenchyma in the same fashion. From that publication a few paragraphs are here utilized to present the authors' contention:

"In conformity with the theory that macrophages are the sole means of transport of pigment into the lung substance, it is generally held that anthracotic deposits within the lung are intracellular with the exception of pigment which may have been liberated by the disintegration of a macrophage. Without implying that pigment-laden macrophages may not occur in or near anthracotic deposits, a more critical attitude will disclose that decisions regarding the intracellular position of pigment are based largely upon conjecture and are not susceptible of demonstration. Cell outlines are not distinguishable and nuclei generally cannot be seen. Only occasionally and in regions where the deposits are less homogenous or less dense an isolated nucleus may be discernible. The determination as to whether such a nucleus is that of a macrophage or of a lymphocyte or even of a fixed connective tissue cell is fraught with great difficulty and any judgment would seem to be arbitrary. It is not rare to find a sharp edge of a pigment mass subtending a portion of a nucleus like a chord, or lying tangent to it and continuing beyond in a straight line so as to suggest that the pigment mass overlies the cell. Certainly, in view of the frequently considerable size of the masses the existence of connective tissue cells and lymphocytes lying within, over, and under the masses need not be doubted."

"A cell on the free surface of the respiratory membrane is properly considered to be outside of the body. It is difficult to match the re-entry of an inflammatory cell into the lung stroma with similar behavior of an inflammatory cell on any other body surface. Such re-entry is a feat of

major proportions since a cell within the alveolus is deprived to some extent of its nutritive medium; also, having ingested foreign material it is generally enlarged and frequently has suffered damage as a result of the phagocytosis. Furthermore, it must insinuate its enlarged body against the positive pressure of the tissues. One might also marvel at the strange type of tropism which is positive prior to the ingestion of foreign material and negative thereafter."

"It has been possible to demonstrate that particulate matter *per se* may penetrate the respiratory membrane and migrate to perivascular and peribronchial positions without the mediation of phagocytic cells. Penetration of the respiratory membrane occurs in multiple, small, scattered foci near the apposition to alveoli and larger vessels and bronchi. Although not demonstrated, it is probable that the penetration of the respiratory membrane by particulate matter is dependent upon defects in the membrane, possibly in the form of erosions. Direct penetration of the alveolar lining by sufficiently fine particles is also a possibility. Important physical factors which make penetration of the respiratory membrane and the migration of particles possible are the fluctuating pressures of the respiratory cycle and the respiratory excursions of the lung tissue."

"On the basis of present experimental observations it would appear that most interstitial pneumoconiotic pigment deposits are probably extracellular agglomerations of particles."

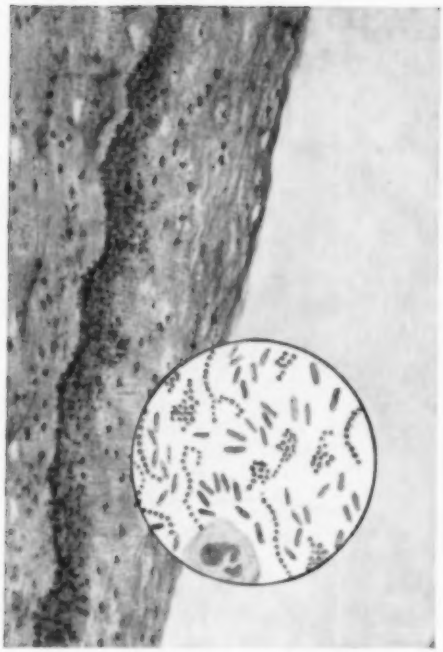
"Assertions that pigment had been carried to its interstitial pulmonary position by macrophages are conjectural and based upon a theory physiologically unsound. Experimental support of this theory is founded upon a premise unacceptable in the light of our present knowledge. More convincing support should be required for continued acceptance of the theory of the 'emigrating-immigrating' or 'returning' macrophage."

IF IN TIME direct penetration by dust of lung tissue becomes finally established and accepted as beyond peradventure, realization must come to hundreds of embarrassed instructors that over the years they have participated in the promulgation of error. Embarrassment need not be in order. The mark of the true scientist is the ability to accept newness and to reorganize thinking in keeping with the requirements of this newness, abandoning the old as no longer tenable. As of now finality may not have been established. This Journal is governed by that old aphorism here mildly misquoted: "Be not the first to accept the new, yet not the last to reject the old. . . ."

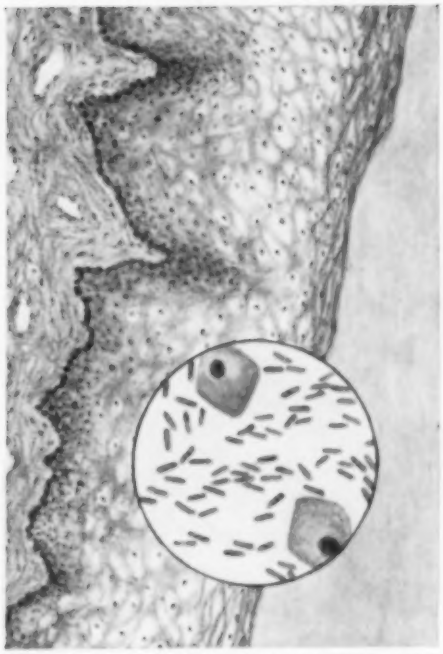
Show Him the Factory

IF IT BE agreed that tremendous significance is to be attached to the techniques of industry as an essence in good industrial medical work, any number of difficult situations as to the private practitioner become clear. A part of the reluctance of the private practitioner to regard himself as part of the total industrial medical force is because of his recognized lack of acquaintance with industrial pursuits. The acquisition of such kinship with industry becomes enormously difficult. If perchance the private practitioner serves patients deriving from 20 or more different industries, every one with different technological activities, as all too often happens, the private practitioner may make disturbing diagnoses and with particular reference to occupational diseases. More often than not all such spring from insufficient understanding of industry's machines, materials, chemicals, intermediate processes and their like. On rare occasion the private physician becomes an instrument in the iatrogenic diseases. Unfortunately in these rare instances, he may make diagnoses of occupational disease that not conceivably could have arisen because in the plant involved there was utterly no opportunity for exposure to the causative factor for the occupational disease in question. By way of example, from a lamp black factory, and truly a dusty one, a patient appeared in the office of a private practitioner and in due course a diagnosis of "silicosis" was attached to a well established lung affection. As to exposures in that lamp black factory, starkly there was no opportunity for exposure to silica, the single causative agent leading to silicosis. In truth, silicosis may have existed and the diagnosis may have been precisely correct, but any such condition unfailingly would have been caused by exposure in some earlier employment. In reality as to this instance, the damaging exposure was connected with previous coal mining in another state. Yet in such matters, the skilled and well meaning private practitioner inaugurates through his lack of full exploration of the work situation a series of disturbing and expensive circumstances conducive to disaffection on the part of the worker himself and his family and the employer, all of which ultimately involve the private practitioner. If any portion of these contentions be true, a measure of remedy quickly is in sight. Show to the private practitioner the industrial pursuits of his community. Permit him better to qualify as the able industrial physician by demonstrating to him the processes of industry that surround him.

—From "Industrial Medicine and the Private Practitioner," by CAREY P. MCCORD, M.D., in *Illinois Med. J.*, June, 1954.



Senile vaginal epithelium is low in glycogen, low in acid and (inset) low in protective Döderlein bacilli, encouraging growth of pathogenic organisms.



Normal vaginal epithelium is high in glycogen, is definitely acid and (inset) contains adequate Döderlein bacilli to combat pathogenic organisms.

Restoring the Normal Acid Barrier to Trichomonal Vaginal Infection

To discourage multiplication of trichomonads and to encourage physiologic protective mechanisms, a comprehensive therapeutic regimen with Floraquin® is instituted.

The normal vagina, by reason of its acid reaction, is provided with a natural barrier against pathogenic microorganisms which require an alkaline medium. When the "acid barrier" is removed, a hypo-acid state results and growth of the protective, physiologic and nonpathogenic Döderlein bacilli is inhibited—to be replaced by such pathogenic organisms as the trichomonad, streptococcus, staphylococcus, colon bacillus and Monilia candida.

As infection develops, the epithelial cell layers, which normally number between forty-five and fifty-five, may decrease to as few as fifteen to twelve layers or may disappear entirely. With this loss of glycogen-bearing cell layers, the available carbohydrate released by physiologic desquamation into the vaginal secretion and ultimately converted into lactic acid is proportionately decreased.

Floraquin not only provides an effective trichomonacide (*Diodoquin®*), destructive to pathogenic organisms, but furnishes sugar and boric acid for reestablishment of the normal vaginal acidity and regrowth of the normal protective flora. G. D. Searle & Co., Research in the Service of Medicine.

Specially Packaged for Industrial Use

ANACIN . . . The Anacin Industrial Unit provides 250 cellophane envelopes, each envelope containing two Anacin tablets. This package offers the advantages of cleanliness and convenience for dispensing to individuals. It also assures the proper dosage in every case. Anacin is preferred in so many industrial dispensaries because Anacin gives fast, long-lasting relief from pains of headache, neuritis and neuralgia. When you order Anacin® tablets, order them in this special sanitary industrial unit, 250 envelopes, or 500 tablets, for $2.83.

BiSoDol Powder . . . Fast acting, antacid alkalizer . . . Packaged in a 16 oz. wide-mouthed bottle for easy, quick dispensing. BiSoDol® is exceedingly effective in relieving upset stomach, acid-indigestion, "gas," heartburn, sour stomach, fullness, nausea and other forms of distress when caused by excess stomach acidity. $2.00 each.

BiSoDol Mints . . . For greater convenience, BiSoDol is also packaged as mint tablets, 500 to the bottle. BiSoDol Mints are so palatable that they may be taken without water, if desired. $1.70 for 500 tablets.

PETRO-SYLLIUM . . . A mineral oil emulsion for the relief of constipation. Available either plain (blue label) or with phenolphthalein (red label). Petro-Syllium® is pleasant to take, gentle, thorough in effect. Packaged in 16 oz. bottles, $8.80 per dozen.

NEW! SPERTI BIO-DYNE® OINTMENT . . . For the treatment of burns, cuts, abrasions, contains biological substances obtained from yeast and fish liver cells which act in minute quantities directly on injured cells to stimulate their metabolism and proliferation. Minimizes scar formation—promotes rapid healing. Packaged in 15 oz. jars @ $48.00 per dozen. (Minimum shipment—3 jars.) Hospital size—5 lb. jar $15.50 per bottle.

REG. U.S. PAT. OFF.

WHITEHALL PHARMACAL COMPANY • New York 16 • N. Y.

News, Comment, Opinion

OVERHEARD in the Corridor: "But we know that can't be done! Didn't we conduct a study against it last year?"

—From *Personnel Administration*, May, 1954.

Long

PNEUMOULTRAMICROSCOPICSILICOVOLCANOKONIOSIS is a lung disease caused by a certain form of siliceous dust found in volcanic regions. —News Item.

Longer

THE American life span has increased nearly four years in the past decade, Public Health Service studies indicate. The average length of life is now 68.5 years.

Nineteenth Annual

THE Nineteenth Annual Meeting of Industrial Hygiene Foundation will be held at Mellon Institute, the Foundation's headquarters, in Pittsburgh, on Wednesday and Thursday, November 17 and 18, 1954.

Daydream Dangers

IN-PLANT accidents, it has been found, occur more frequently immediately before and after vacation periods. It seems that workers daydream about future fun or past enjoyments instead of paying careful attention to their jobs. Evidently, then, spring and summer might be good times to run a safety contest, or to brief foremen on closer safety supervision of employees who are soon to go on vacation or have recently returned.

—*Employee Relations Bulletin* (National Foremen's Institute, Inc.); in *Management Review*, June, 1954.

The Fringe on Top

TIME was when a payroll amounted to no more than what a company paid its workers at the end of the week. Today, what with pensions, social security, insurance premiums and a host of other fringe benefits, there is a big payroll cost piled on top of the wages themselves. Just how big it is was reported last week by the U.S. Chamber of Commerce, which studied 1953 fringe payments by 529 firms (each with 500 or more employees). From its sample the chamber put the total cost of fringe benefits for all U.S. companies at nearly $25 billion a year. Average cost a company: 19.7% of the payroll, or almost $1 for every $5 paid in wages.

—*Time*, May 31, 1954.

Psychiatry Prevents Waste

INDUSTRIAL psychiatry is a phase of preventive medicine which aims to detect and forestall serious mental and emotional maladjustments among industrial employees. I have seen many workers with 10 and 15 years of satisfactory employment who, in the hysteria of a single moment, tore their records to pieces. Is it not much simpler and much more efficient to eradicate the sickness instead of the employee? Industrial psychiatry attempts to assess the personality in order that the job may be fitted to the man, a job which will satisfy his values and give scope to his creative energies.

—LYDIA G. GIBERSON, M.D., Metropolitan Life Insurance Company, in *Medical Advance*, May-June, 1954.

Dept. of World-Shaking News

TITLE of a study by three psychologists in a recent issue of a professional journal: "The Effect of Hammer Size on Efficiency in the Task of Nailing." *Data:* Three tables of statistical analysis. *Conclusion:* Large hammers are better for larger nails; smaller hammers are not significantly better for smaller nails. *Comment:* Really, now!

—*Personnel Administration*, May, 1954.

Medical Literature—and Laundry

LAUNDRY KITS—somewhat smaller than those Joe College uses in which to send his dirty wash home to mother—have proven to be extremely satisfactory containers for the two-way shipment of medical journals and other library reference materials. The Memorial Library of the Texas Medical Association reports that the use of these small "laundry kits" has solved an age-old problem for the shipment of materials to physicians. Paper cartons of all sizes previously had been used by the Library in filling requests of physicians. More often than not, these cartons were thrown into the wastebasket upon receipt by the physician. As a result, the physician, or his secretary, or nurse, was forced "to scrounge around" to find containers that could be used when

OUR 57th YEAR

WOODWARD

Medical Personnel Bureau

FORMERLY AZNOES

3rd floor • 185 N. WABASH AVE. CHICAGO • 1

• ANN WOODWARD • Director

Founders of the counseling service to the medical profession, serving medicine with distinction over half a century.

POSITIONS WANTED

Physician: (245) 30; Class "A" graduate; one year, internship; one year, Fellowship, industrial medicine, important industrial medicine laboratory; one year, Director, Health and Safety Division, university and AEC program; interested industrial medicine as career, preferably with opportunity with isotopes. Radiology or nuclear-energy as applied to medicine; excellent as assistant to Medical Director, this type program; Category IV.

Medical Director: (246) 36; M.D., Jefferson Medical College; qualified, industrial hygiene; diseases of the chest; residency in medicine and surgery; two years, private general practice; one year, medical examiner, important railroad; five years, industrial physician, heavy industry; Class IV; $10-$12,000.

Industrial Hygienist: (247) 30; M.D., C.M., Queen's University, Ontario; two years, internship; one year, surgical residency; three years, government medical officer, industrial division; prefers East or New England.

Medical Director: (248) 42; Class "A"; five years, Medical Director, important company; (14,000 employees); three years, Medical Director, major company with 16,000 employees; seeks challenging opportunity; outstanding record of achievement.

Staff Physician: (249) M.D. degree, Pittsburgh Medical; four years, mine physician; 12 years, very successful private general practice; seeks industrial position in West, preferably Wyoming or Montana with opportunity for private practice; late 30's.

Staff Physician: (250) Graduated, University Nebraska, Medical; following years rotating internship has had several years experience in own private general practice; prefers industrial salaried position; 34.

Staff Physician: (251) 41; M.D., Vermont Medical; rotating internship; ve years, flight surgeon, USAF; three years, fellowship, pathology; medical school; two years, assistant medical director, insurance company; finishing three year tour of military duty as Base Surgeon; well-qualified man as assistant to busy Medical Director, $9-10,000.

Medical Director: (252) M.D., University of Virginia; Diplomate, American Board of Internal Medicine; experience includes four years, Flight Surgeon, USAMC; years' private general practice; three years, Assistant Medical Director, Life Insurance company and two years, physician, major Eastern company, well-qualified to organize develop and supervise industrial health program, late 30's; excellent recommendations.

POSITIONS OPEN

Medical Director: (105) leading company; 35 plants; complete charge program, policies; career post; headquarters, large city; East.

Medical Director: (106) Important regional plant; major company; key post; pleasant living near important educational center; above-average advancement potential; California.

Director, Industrial Hygiene: (107) Requires Degree in chemistry and minimum, five years experience in the general field of industrial hygiene; major company; leader in its eld; attractive town 60,000 near university medical center; substantial; Middlewest.

Associate Medical Director: (108) Replace present associate leaving after 15 years; outstanding industrial medical program; machine tool manufacturer; 7000 employees; $10-12,000; large city; university medical center; known to us and recommended.

Please write for an Analysis Form so we may prepare an individual survey for you.

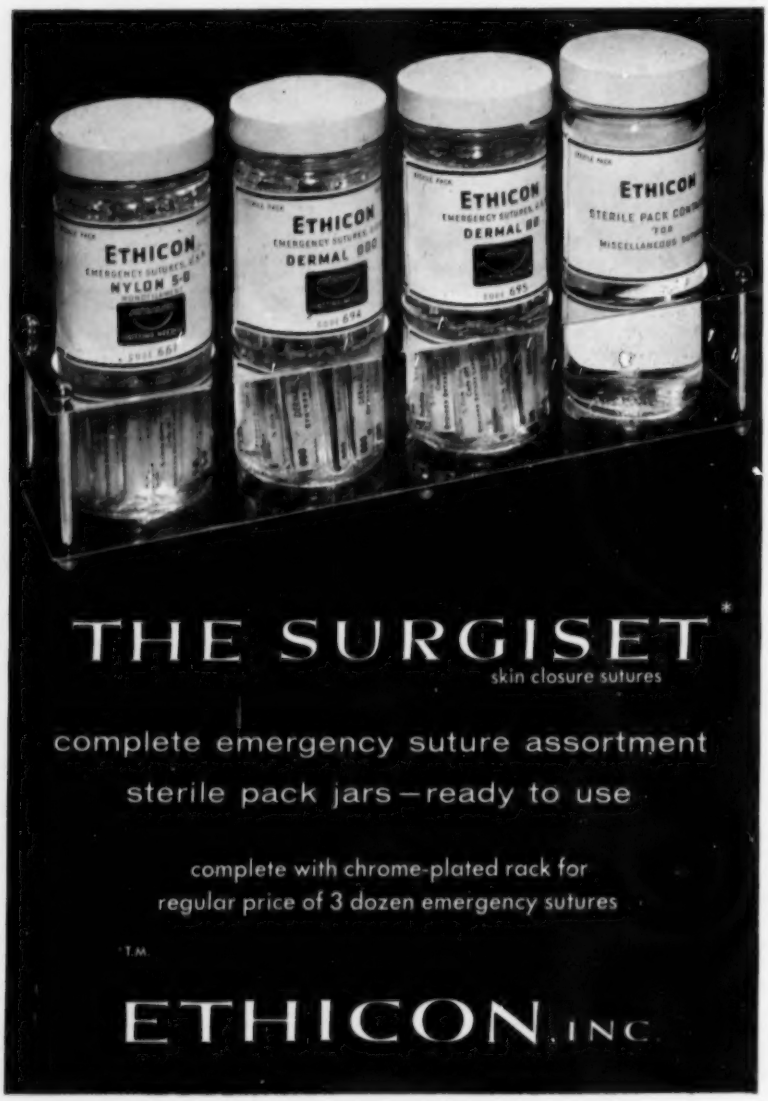
STRICTLY CONFIDENTIAL

the library materials were ready for return shipment, and many of these containers, held together by string and adhesive tape, were torn apart before reaching the Library, causing damage to the materials. Today the Memorial Library has a supply of 150 "laundry kits"—and they are in constant use!

Medical Group Practice

THE Medical Society of the State of New York has adopted a modification of the code of medical ethics which is to be passed on for approval by the American Medical Association. A provision in the proposed code which would forbid the payment of a salary to any physician who is not connected with an institution where patients are "public charges" would seem likely to close the offices of group practitioners of medicine and the medical departments of industrial corporations, farm cooperatives and labor unions, even though their medical standards may be high. The State Medical Society's proposal would actually interfere with free choice of a physician because it would prevent any citizen from consulting a group of salaried practitioners. A subscriber may consult an outside physician at any time if he is dissatisfied with the service rendered by the group. The system is devised to give a patient at a reasonable cost the benefit of expensive laboratory diagnosis and of the services of specialists, sometimes without extra charge. Medicine is much too complicated and ramified for any one practitioner to pretend that he knows all that his patients expect him to know about a thousand diseases. If he is conscientious he will draw in specialists when necessary and have diagnostic tests made in a laboratory. All this is expensive, and, because it is, expensive prepaid group practice has sprung up. It is unlikely that the State Medical Society's proposals will be adopted as they stand by the national organization. The alternative would seem to be compulsory health insurance, which is precisely what organized medicine has been fighting for many years.

—*New York Times*, May 15, 1954.



Industrial Health Forum

ON THE occasion of the dedication of the Martha Tracy Memorial for Preventive Medicine, March 11, at the Woman's Medical College of Pennsylvania, a health assurance forum was conducted. The proceedings of the forum, which stressed the conservation of human resources in industry, have been published as a mimeographed pamphlet. In the keynote address Dr. Burgess L. Gordon, President of the college, stated that when employees are sick and must be absent from work the whole national economy suffers. The magnitude of the problem is indicated by the fact that in the United States about two million industrial workers are absent because of sickness every working day. Dr. Anna M. Baetjer, in speaking of environmental influences, divided the factors that may cause occupational diseases into physical (such as extremes of temperature, harmful radiation, excessive noise, and abnormal barometric pressure), chemical (such as silica dust, toxic metallic dusts and fumes, organic vapors, and gases), infectious, and mechanical

(such as vibration, friction, pressure, and excessive lifting). She stated that in addition to the specific occupational diseases the role of the occupational environment on susceptibility to disease must be considered. The prevention of occupational diseases depends on the cooperation of persons trained in medicine, physiology, toxicology, engineering, chemistry, physics, and other disciplines. Industries are becoming increasingly aware of the importance of the health of their employees and are spending vast sums on improving the working environment as well as other means of disease prevention. Dr. Francis J. Braceland spoke of mental hazards in industry, a field to which he believes too little attention has been paid in the past. He cited an experiment that showed that regardless of the working conditions, productivity depended on the *esprit de corps* of the workers. Many of the hazards are brought to the job by the worker. These have to do with personality maladjustment, mood disorders, deep-seated inferiority feelings, and the like. Such personality disorders may result in absenteeism, accidents, alcoholism, illness, job dissatisfactions, and office feuds. In the removal of these hazards the medical department, the personnel department, and the immediate supervisors of the employees must work as a team. The most important member of this team is usually the employee's supervisor, and for this reason supervisors must be taught the fundamentals of interpersonal relations. Dr. William A. Sawyer discussed the problem of absenteeism and referred to the experiment at the Hawthorne Works of Western Electric, in which it was shown that the employees with high absence rates had had frequent minor illnesses and a large number of major illnesses, frequent injuries and accidents, and many emotional ups and downs. They were, in general, discontented, unhappy, and difficult to get along with and to supervise, whereas in a group with a good attendance record the opposite conditions prevailed. In order to get at the root of this problem, employees with a record of excessive absences should be recognized early and an effort made to discover the underlying cause and to apply corrective measures. Dr. Ronald F. Buchan outlined the health service needs of small and large industries and divided these into services related to the individual workers (such as physical examinations, health counseling, health education, and treatment of occupational illness) and services related to the environment (detection and elimination of mechanical hazards and toxic exposures, maintenance of plant sanitation, and control of waste material to prevent water and air pollution). Dr. Buchan stressed the benefits to be derived from industrial medical services, chief among which are the maintenance and conservation of health, reduction of labor turnover, reduction of accidents and occupational diseases, reduction of absenteeism, and increase in production. Speaking of the proper age for retirement, Dr. Earl C. Bonnett called attention to the large number of

The Key

to successful therapy . . .

for Contact Dermatitis

- **Contact Dermatitis** IS THE MOST FREQUENTLY ENCOUNTERED OF ALL DERMATOLOGICAL DISORDERS.
- THE OBJECT OF THERAPY IS TO SOOTHE AN ALREADY IRRITATED SKIN. DO NOT OVERTREAT.
- THERE ARE NO CUTANEOUS CONTRAINDICATIONS TO BATHS, SOAKS OR WET DRESSINGS. MAKE USE OF THEM.
- AVOID GREASY PREPARATIONS (SALVES) ON ACUTELY INFLAMED OR EXUDATIVE AREAS.

REDUCE ABSENTEEISM
PROMOTE FASTER HEALING
AVOID OVERTREATMENT

Samples to Physicians on Request.

Effervescent

Domeboro® Tabs

Modernized Burow's Solution
(1:20 ALUMINUM ACETATE)

FOR WET DRESSINGS, PACKS & SOAKS. THE NUMBER ONE SOLUTION USED IN INDUSTRY TODAY FOR SUCCESSFUL TREATMENT OF CONTACT DERMATITIS.

DOME CHEMICALS, INC.
109 WEST 64 ST., NEW YORK 23, N. Y.

Rugged

. . . but his Hands need Protection

STEPAN

pH-6

The lotion-like skin cleanser

pH-6 is a specially formulated, sulfonated oil, bland skin cleanser . . . amazingly effective in removing oils, greases, and other industrial grime. Lotion-like effect actually protects the skin . . . leaving it clean, smooth, and supple.

Neutra-Foam

New mild synthetic skin detergent with excellent foaming properties. Leaves no disagreeable soapy odor on the skin.

You'll find both pH-6 and Neutra-Foam are surprisingly economical. Send coupon for literature and samples.

STEPAN CHEMICAL COMPANY

The Stepan Chemical Co. 1M
20 N. Wacker Drive, Chicago 6, Illinois
Please send pH-6, Neutra-Foam literature and samples.
Name .....
Firm .....
Street Address .....
City and State .....

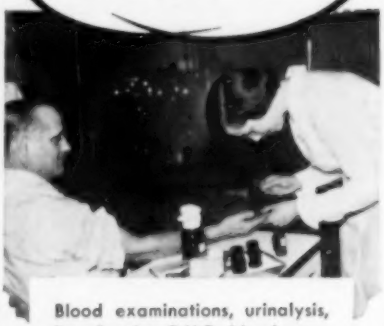
men over 65 years of age employed full-time or part-time and stressed the need for a more realistic approach to the problem. Dr. Donald A. Covalt, in further discussing this problem, advocated the establishment of medical boards to survey employees and establish the amount of time they could be usefully employed after reaching an age when their capacity for work is decreasing. Dr. W. E. Chamberlain forcefully objected to the present preoccupation with retirement and stated that industry should concern itself with the reorientation of aging employees. He pointed out that if a man is successful and enjoying his work retirement can have a tragic effect on his personality. An increasing demand for study of industrial health problems and the application of concrete measures for their relief was responsible for the sponsoring of this forum. The effort, time, and money expended will have been justified only if its influence extends beyond the community in which it was held and leads to further consideration of these and similar problems throughout the nation and to the taking of appropriate remedial steps. There is a growing tendency on the part of industrial firms, when the health problems for which they are responsible are clearly delineated, voluntarily to undertake their elimination. This is the American way and is far better than dependence on governmental control.

—Editorial, *J.A.M.A.*, May 29, 1954.

The Housewife

CONCERN over the industrial worker, handicapped from whatever cause, has become a major medical consideration, and his rehabilitation and re-entry into the ranks of the employed have become almost standard procedure. Much less has been said about the silent working partner in the enterprises of man, who, by providing a home for him in health or in sickness, makes it possible for him to work at top level when well and to benefit fully from his rehabilitation after illness. Various types of physical handicap, however, may affect the woman also, even more than they do the man, for she has frequently the burden of pregnancy and childbearing added to the unremitting toil of the homemaker seven days a week. Cognizant of this situation, so obviously unfair to unorganized labor, the

When You Refer Patients with **ALCOHOLISM..**



Blood examinations, urinalysis, liver function, B.M.R., blood sugar and other important diagnostic tests are performed in a modern, well-equipped laboratory.

Years of experience in the specialized care of alcoholic addiction enable The Keeley Institute to embody the following phases of therapeutic approach—gradual withdrawal, physical rehabilitation, re-orientation and re-education.

Soon after admission the patient is given a thorough physical examination and laboratory studies. His nutritional status—highly important in alcoholism—is thoroughly investigated. Pertinent information regarding physical and psychosomatic disorders is obtained and related to each successive examination.

All patients receive the utmost consideration from our staff of full-time physicians. Restraining methods and avulsive reactors are not employed. The referring physician is constantly informed of the patient's progress.

Member, American Hospital Association
Member, Illinois Hospital Association
The Keeley Institute is registered with the Council on Medical Education and Hospitals of the A.M.A.

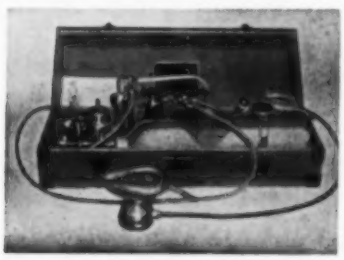
Complete information, including rates, will be furnished to physicians on request.

THE KEELEY INSTITUTE
DWIGHT, ILLINOIS

EMERGENCY!

Are you completely equipped to handle it?

When the Emergency arises where respiration is involved, you can be confident when your



Stephenson "Minuteman" Resuscitator Inhalator Aspirator

is available.

So simple to operate.

Here is your best insurance against respiratory Emergencies.

Weighs only 30 pounds

Ask for folder M 106

STEPHENSON CORPORATION
RED BANK NEW JERSEY

Makers of the Harger Drunkometer, used all over in industry and police departments including New York.

American Heart Association has developed a work-simplification program designed to aid the physician in prescribing a routine workday for his women cardiac patients. Studies of the housewife's daily tasks have been made and from them a series of work-simplification classes designed. Each woman handicapped by heart disease, on referral by her physician, is encouraged to attend four two-hour lecture demonstration classes, held at weekly intervals. Here she is instructed in the adaptation to household tasks of work-simplification technics, enabling her to save up to 75% of her energy. Already in operation in various states, the program will shortly be introduced into this commonwealth as a free community service of the Massachusetts Heart Association.
—Editorial, *New England J. Med.*, May 20, 1954.

The Psychiatrist Helps

FOLLOWING are three examples of how psychiatrists are serving corporations: Dr. Ralph T. Collins, Consultant to the Medical Department at Eastman Kodak Co., Rochester, New York, sees employees referred by foremen or who seek his help with individual problems. He conducts classes in human relations as part of the company's regular training program for supervisors and nurses. He confers regularly with company executives on matters likely to affect employee attitudes. Dr. Collins, who is Chairman of the Committee on Industrial Health of the American Psychiatric Association, is a strong believer in making allies of the supervisory staff, the nurses and Kodak's "employee counselors." He "works with people who work with people," helping train them to sharpen their insight. Ninety percent of the workers' emotional problems, he believes, originate outside the plant, and the supervisory staff, if trained to detect incipient disturbances, can help the worker head them off. Dr. Walter D. Woodward, of American Cyanamid Company, divides his time more or less equally between practice and prevention. About 75% of the people he sees are "self-referrals," employees who voluntarily seek his help with a personal problem. Nurses and supervisors are encouraged to suggest voluntary visits by troubled workers. Early detection is the key to the Cyanamid prevention program. Through the

Shay Medical Agency

PITTSFIELD BUILDING
55 E. WASHINGTON STREET
CHICAGO 2, ILLINOIS

BLANCHE L. SHAY, *Director*

Service of Distinction since 1914

POSITIONS OPEN

Associate Industrial Physician: (S-2379) West. Excellent opportunity to become associated with two young industrial physicians who have a fine industrial practice; own medical building. Good future. $12-18,000.

Staff Physician: (S-2264) Large manufacturing company. Excellent medical program. Good opportunity for future advancement as company has plants in all parts of country and their policy is to advance from within.

Staff Physician: (S-2182) South. Plant employing about 4,000. Duties; practice of industrial medicine in its most comprehensive aspects; time and opportunity for study and research into problems peculiar to industry.

Staff Physician: (S-2021) Large Steel Company. Real opportunity for advancement if interested in industrial medicine as a career. $9,000 to start.

POSITIONS WANTED

Medical Director: (KS-654) Age 45. M.D. degree, Northwestern University Medical School; Fellowship in surgery, Northwestern University; Associate in surgery, Cook County Hospital. Ten years administrative experience in the field of industrial medicine. Has organized and directed comprehensive medical programs.

Medical Director: (CM-654) Age 48. M.D. degree, Jefferson Medical College; Master of Public Health, Columbia University. Has specialized in Industrial Health Administration; eligible for American Board of Preventive Medicine. Twenty years experience.

Staff Physician: (BM-654) Age 28. M.D. degree, Louisiana State University Medical School. One year general practice residency. Excellent references. Class IV. Prefers South or Southeast.

Industrial Surgeon: (HPM-654) Age 45. M.D. degree, University of Michigan Medical School. Certified in surgery, 1946.

Staff Physician: (EH-654) Age 32. Has passed Part I American Board of Physical Medicine and Rehabilitation; M.S. in Occupational Medicine; graduated Master of Public Health 1952. Will go anywhere.

Industrial Nurse: (MA-654) Age 37. Ten years experience in industry. Good administrative background. Available now, will go anywhere.

Industrial Hygiene Engineer: (AO-654) Age 35. Master's degree. Has set up and directed programs for several leading manufacturing companies. Fine references.

A NEW *Quick* TOPICAL ANESTHETIC FOR OFFICE AND DISPENSARY

Americaine AEROSOL

AUTOMATIC SPRAY TOPICAL ANESTHETIC
CONTAINING 20% DISSOLVED BENZOCAINE

Just press the button and spray on this quick topical anesthetic. Clean, sanitary, painless to apply to traumatized areas. Prompt, sustained control of surface pain and itching. Bacteriostatic, helps prevent infections.

For—

- BURNS
- ABRASIONS
- LACERATIONS
- ECZEMAS
- WOUND DEBRIDEMENT

Also Available:
AMERICAINE Topical Anesthetic Ointment in ½ and 1 lb. jars.
FREE—*Send for Samples and Literature.*

In Canada: Brant Laboratories, Ltd., Toronto

ARNAR-STONE LABORATORIES, INC.
1316-D Sherman Ave., Evanston, Illinois

education of executives, union stewards, supervisors, nurses and the workers themselves, Dr. Woodward has established his office as an important part of the company's human relations program. He is a consultant to the management development program. Dr. Frederick W. Dershimer, of E. I. du Pont de Nemours & Company, emphasizes the positive approach on the part of industry. That is, he seeks to encourage those activities and conditions which promote good mental health, as well as get rid of the bugs which foster disturbances. Good leadership on the part of company executives goes a long way, he has observed, toward building up that feeling of security so necessary to peace of mind. Unless a troubled worker has a disabling organic ailment, he is encouraged to continue at his regular work. If he is required to live up to his normal responsibilities, it is felt, he has a better chance of overcoming his disturbance than if he is coddled.

—From "Psychiatry in Industry," in *Medical Advance*, May-June, 1954.

Upjohn

THE UPJOHN COMPANY'S aim in developing its health insurance program has been to make available to our employees coverage of a kind that would give them real assistance in meeting the costs of illness. We believe that our present plan, the outgrowth of a 10-year period of experimenting with various programs and adapting them to the needs of our group, meets this objective. Our health insurance program applies alike to employees and their dependents (wives and

Reece Wood Sole Acts As Splint

REECE ORTHOPEDIC SHOE

No. x175-CG—Men's No. x173-CG—Women's

for

BROKEN FOOT BONES
CRUSHED TOES SWOLLEN FEET

SMOOTHLY finished WOOD SOLE with AIRFOAM insole acts as splint. Keeps injured foot immobile.

Keeps a man on his feet and on the job. Cool, firm but lightweight canvas upper laces entire length . . . makes for perfect fitting even though heavily bandaged. SIZES—Small, Medium, Large.

WRITE FOR FOLDER

REECE WOOD SOLE SHOE CO.

Dept. M Columbus, Nebr.

MOISTAIRE
The Original Heat Therapy Unit

UNEXCELLED
for the delivery of moist heat at the exact prescribed temperature.

COMFORT • SAFETY • DURABILITY

MOISTAIRE accepted and approved since 1944 by the Council on Physical Medicine and Rehabilitation (AMA) and Underwriters' Laboratories.

For illustrated information write, wire or call:

The RIES *Corporation*

515 SOUTH AIKEN AVE., PITTSBURGH 32, PA.

RESULTS COUNT!...In Superficial Fungous Infections *especially* **DERMATOMYCOSIS PEDIS**
(Athlete's Foot)

ANTI-MYCOTIC
ANTI-PRURITIC
ANTI-BACTERIAL

USE **Desenex®**

Ointment and powder of ZINCUNDECATE
Solution of UNDECYLENIC ACID

Pharmaceutical Division
WALLACE & TIERNAN INCORPORATED, Belleville 9, N. J., U.S.A.

Cures average case in one to three weeks

PD-32

unmarried children under 19). Members contribute a nominal amount, about 10% of the cost. Over 99% of the eligible employees are members, and they have subscribed voluntarily. Retired employees and their dependents are insured at company expense. The plan reimburses the employee for the expenses of hospitalization, surgery, doctors' calls in the hospital, and diagnostic x-rays and laboratory examinations. The hospitalization plan covers the full cost of hospital care up to 120 days for each period of disability when the employee or dependent uses semi-private or ward accommodations. All types of disabilities are covered, except those provided for by workmen's compensation. The only limitations are that confinement must be recommended and approved by a doctor; also, the insurance does not apply to confinement in facilities owned or operated by the United States government. This Upjohn plan is carried with an insurance company.

—From "Solving the Health Insurance Problem—One Company's Approach," in *Management Review*, June, 1954.

Misplaced Hopes

DR. WILLIS I. LEWIS, the retiring president of the Illinois State Medical society, said in his valedictory address that members of the medical profession who rallied to Mr. Eisenhower in the 1952 Presidential election have been disappointed. They thought, he said, that a Republican victory would end the New Deal drift toward socialization of the medical profession. Dr. Lewis found, however, that that trend had not diminished but had accelerated. He cited creation of a new department of health, education, and

In Peptic Ulcer management and in Hyperacidity

The *Non-constipating*
Antacid Adsorbent

Gelusil®

A pleasant tasting combination of especially prepared aluminum hydroxide gel and magnesium trisilicate.

WARNER-CHILCOTT
Laboratories NEW YORK

Each tablet contains:
Pamabrom . . . . . 50 mg.
Acetophenetidin . . . . . 100 mg.
Dose: One tablet q.i.d. starting 5 days before expected onset of menses.

The Calendar Holds the Key...

In tension-anxiety states, consider premenstrual tension . . . when cramps, leg pains, nausea, irritability, insomnia, and edema appear regularly before menstruation. Evidence shows these symptoms are due to excess fluid balance—effectively reduced in 82% of cases with M-Minus 5.[1]

1. Vainder, M.: Indus. M. & S., 22:183

Antitensive and analgesic for pain-free, tension-free premenstrual days

M-Minus 5®

WHITTIER LABORATORIES 919 N. Michigan Ave., Chicago 11, Illinois

welfare, with cabinet status, under "a New Dealer from Texas." Such an extension of social security and welfare concepts into the province of medicine, the doctor recalled, had been consistently fought when Oscar Ewing was trying to build his New Deal federal security agency to department status. Yet, under the Republicans, the transformation was accomplished with hardly a murmur. Again, the president of the state society said that the administration had sought to press upon the doctors three legislative developments which, virtually unanimously, they opposed. These were the compulsory enrolment of doctors in the social security system, now abandoned; the reinsurance by the federal government of health care costs, and authorization of physicians to certify disabled persons for maximum old age benefits. These complaints fortify the teaching that, in politics especially, the buyer must beware. Political labels no longer provide a guarantee of the purity of doctrinal content. Some varieties of Republican are as New Deal as the New Dealers. The "creeping socialism" about which so much was heard in New Deal days has continued to creep under an administration calling itself Republican. It is not only doctors, but all citizens, who are caught in the middle of a political squeeze in which the policies of one party are identical with those of the other. The only encouraging element is that there is a developing awareness of this state of affairs.

—Editorial, *Chicago Tribune*, June 5, 1954.

For Comprehensive, Emergency and Routine Burn Therapy

HEXATHRICIN
Aeropak (AUTOMATIC SPRAY)

Relieves Pain . . . Controls Infection . . . Assists Epithelial Regeneration and Formation of Healthy Granulation Tissue . . . . Promotes Grafting "Takes" . . . Shortens Healing Time . . . Economical for Physician and Patient.

Write for Professional Literature.

Lincoln LABORATORIES, INC.
P. O. BOX 1139 DECATUR, ILLINOIS

Nothing to Hide but PSORIASIS

RIASOL has made many an embarrassed woman proud to wear a revealing bathing suit. By clearing the ugly patches of psoriasis, it leaves a normal healthy skin for admiring eyes.

It is well known that exposure to abundant sunlight at the beaches is beneficial in psoriasis. Few patients, however, will expose themselves to curious and critical eyes until the skin patches have been controlled with RIASOL.

RIASOL acts best when the treated parts are also exposed to direct sunlight. For this reason it is advisable to treat all cases of psoriasis intensively during the summer months.

Medical statistics show that favorable results are obtained in approximately 76% of all cases of psoriasis treated with RIASOL.

RIASOL contains 0.45% mercury chemically combined with soaps, 0.5% phenol and 0.75% cresol in a washable, non-staining, odorless vehicle.

Apply daily after a mild soap bath and thorough drying. A thin invisible, economical film suffices. No bandages required. After one week, adjust to patient's progress.

Ethically promoted RIASOL is supplied in 4 and 8 fld. oz. bottles at pharmacies or direct.

Before Use of RIASOL Treatment

After Use of RIASOL Treatment

MAIL COUPON TODAY—
TEST RIASOL YOURSELF

SHIELD LABORATORIES
12850 Mansfield Avenue, Detroit 27, Michigan

IM-7-54

Please send me professional literature and generous clinical package of RIASOL.

M.D. _____ Street _____

City _____ Zone _____ State _____

Druggist _____ Address _____

RIASOL for PSORIASIS

Fast, Continued Relief of Sunburn Pain

ANTISEPTIC • ANALGESIC

FOILLE

LIQUID OR OINTMENT

For

Sunburn • Burns

Cuts • Abrasions

Local Skin Irritations • Insect Bites

FOILLE antiseptic-analgesic is a dependable, convenient, surgical-type dressing which has won wide use and acceptance by Doctors, Hospitals and Industrial Plant Clinics over a period of twenty years.

CARBISULPHOIL COMPANY

2 921 Swiss Ave. Dallas, Texas

*YOU'RE INVITED TO REQUEST LITERATURE AND SAMPLES

Advertisers

Arnar Stone Laboratories 32
Ayerst, McKenna & Harrison 16
Bauer and Black 23
Becton Dickinson & Co. 17
Breck, Inc. 20
Bristol Myers Company 3rd cover
Burroughs Wellcome & Co., Inc. 2
Carbisulphoil Company 36
Ciba Pharmaceuticals 4th cover
Desitin Chemical Company 19
Dome Chemicals, Inc. 29
Eaton Laboratories 22
Ethicon, Inc. 28
Hillman Pharmaceuticals 36
Keeley Institute 30
Lilly, Eli, & Company 24
Lincoln Laboratories 34
Menley & James 22
Nepera Chemical Company 2nd cover and 15
Packwood Mfg. Co. 18
Reece Wood Sole Shoes 32
Ries Corporation 32
Riker Laboratories 14
Roerig, J. B., & Company 1
Sacro-Matic, Inc. 21
Schenley Laboratories 7
Schering Corp. 9
Searle, G. D., & Co. 25
Shay Medical Agency 31
Shield Laboratories 35
Stepan Chemical Company 30
Stephenson Corp. 31
Warner-Chilcott, Inc. 33
Wallace & Tiernan 33
Westwood Pharmaceuticals 13
Whitehall Pharmacal Co. 26
Whittier Laboratories 34, 36
Winthrop Stearns 5
Woodward Medical Personnel Bureau 27
Wyeth, Inc. 33

Prompt Release from FEAR

of Menstrual Pain

HILLMAN'S "D" COMPOUND

Painful cramps and spasm excite fear and tension. Often fear aggravates dysmenorrhea. HILLMAN'S "D" COMPOUND ends fear by promptly relieving pain. Patients return to work sooner, are more comfortable and more efficient.

WRITE for descriptive booklet and FREE SAMPLES

HILLMAN PHARMACEUTICAL CO.

185 N. WABASH AVENUE • CHICAGO 1, ILLINOIS

3-WAY RELIEF IN JOINT AND MUSCLE PAIN . . .

ARTHRALGEN presents the powerful vasodilator, methacholine chloride, which is absorbed directly through the skin—dilates BOTH arterioles and capillaries. Combined with methyl salicylate, menthol and thymol to produce prolonged analgesia and powerful rubefacient and counterirritant effect.

WHITTIER LABORATORIES

919 N. Michigan Ave., Chicago 11, Illinois

FOR STRAINS, SPRAINS, MYALGIA, ARTHRITIC AND RHEUMATIC PAIN, NEURITIS, LUMBAGO, ETC.

ARTHRALGEN®

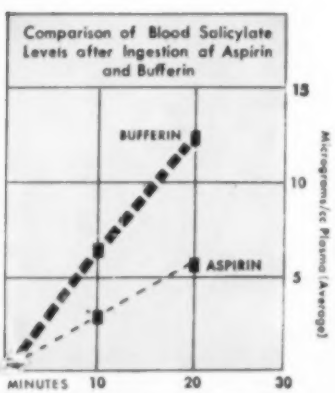
VASODILATOR • RUBEFACIENT • ANALGESIC

dilates both arterioles and capillaries

AVAILABLE in 1 oz. tubes and 8 oz. jars.

FREE. Send for sample and literature.

DON'T SEND HIM HOME—GIVE BUFFERIN®



EACH BUFFERIN TABLET contains 5 grains of acetylsalicylic acid, together with optimum amounts of the antacids aluminum glycinate and magnesium carbonate.

For minor aches and pain, BUFFERIN is the ideal analgesic for industrial use. It relieves pain promptly—*acts twice as fast as aspirin.*[1] Instead of going home the worker can go back to his job.

BUFFERIN is antacid. It is tolerated four to five times better than aspirin, as studies in a large industrial organization have demonstrated.[2] This is important, for there is little use in giving a worker an analgesic "that leaves him with nausea which also incapacitates him."[2]

REFERENCES: 1. Effect of Buffering Agents on Absorption of Acetylsalicylic Acid. J. Am. Pharm. Assoc., Sc. Ed. 39:21, Jan. 1950. 2. Gastric Tolerance for Aspirin and Buffered Aspirin. Ind. Med. 20:480, Oct. 1951.

THE SPECIAL INDUSTRIAL PACKAGE MAKES DISPENSING EASY

A box of 250 individual packets, each containing two BUFFERIN tablets, hermetically sealed in aluminum foil lined with protective cellulose acetate. The special low cost is $3.25. Order your package today.

Accepted Council on Dental Therapeutics American Dental Association

BUFFERIN® ACTS TWICE AS FAST AS ASPIRIN DOES NOT UPSET THE STOMACH

BRISTOL-MYERS COMPANY, 19 WEST 50 STREET, NEW YORK 20, N. Y.

A similar package available from Bristol-Myers Co. of Canada, Ltd., 3035 St. Antoine St., Montreal 30, Canada

Nupercainal®

long-acting
surface
anesthetic

For relief of pain and itching in sunburn, simple burns, hemorrhoids, diaper rash, fissured nipples, skin abrasions, athlete's foot, and other conditions in which surface anesthesia is desired; also indicated as an anesthetic-lubricant for instrumental procedures, and in ophthalmology.

Nupercainal Ointment is particularly suitable for mucous membranes and for dry, encrusted surfaces. For moist or weeping lesions, Nupercainal Cream is available.

NUPERCAINAL OINTMENT
(1% Nupercaine® base in lanolin and petrolatum base)

NUPERCAINAL CREAM
(0.5% Nupercaine base in water-washable base)

NUPERCAINAL OPHTHALMIC OINTMENT
(0.5% Nupercaine base in white petrolatum)

SURGERY OBSTETRICS

OPHTHALMOLOGY PROCTOLOGY

Nupercainal® Ointment
(dibucaine ointment CIBA)

Nupercainal® Cream
(dibucaine cream CIBA)

CIBA
SUMMIT, N. J.